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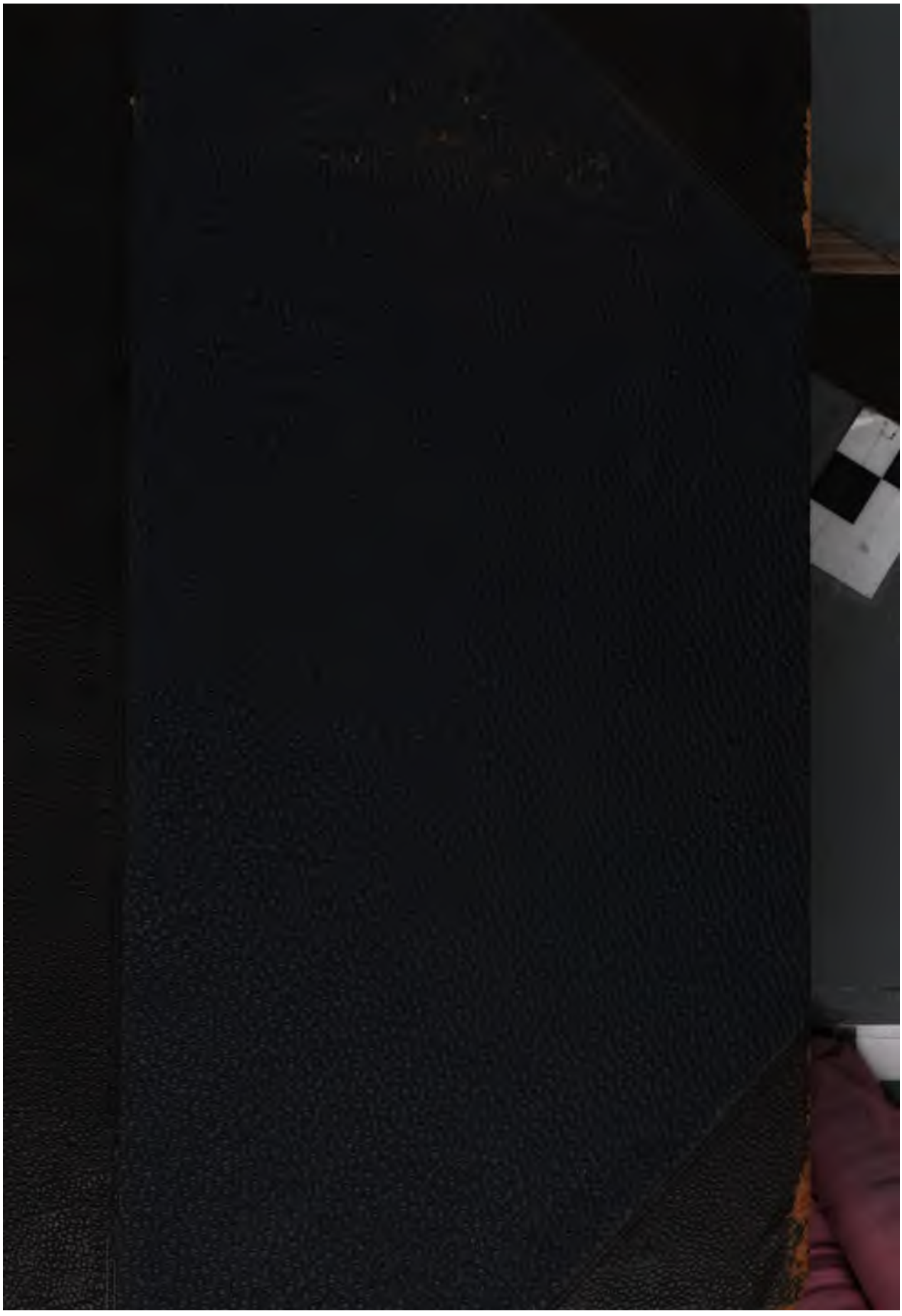

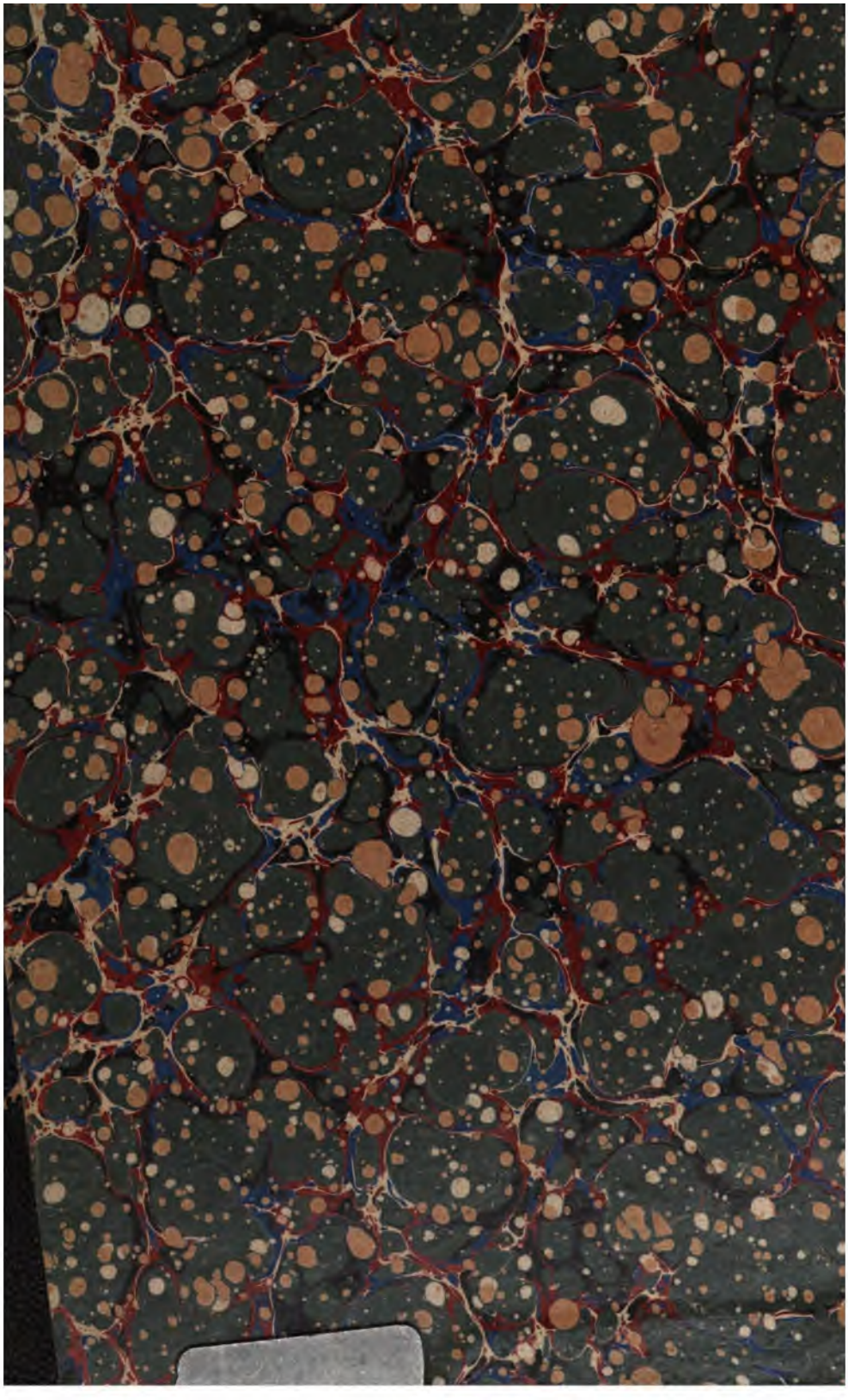

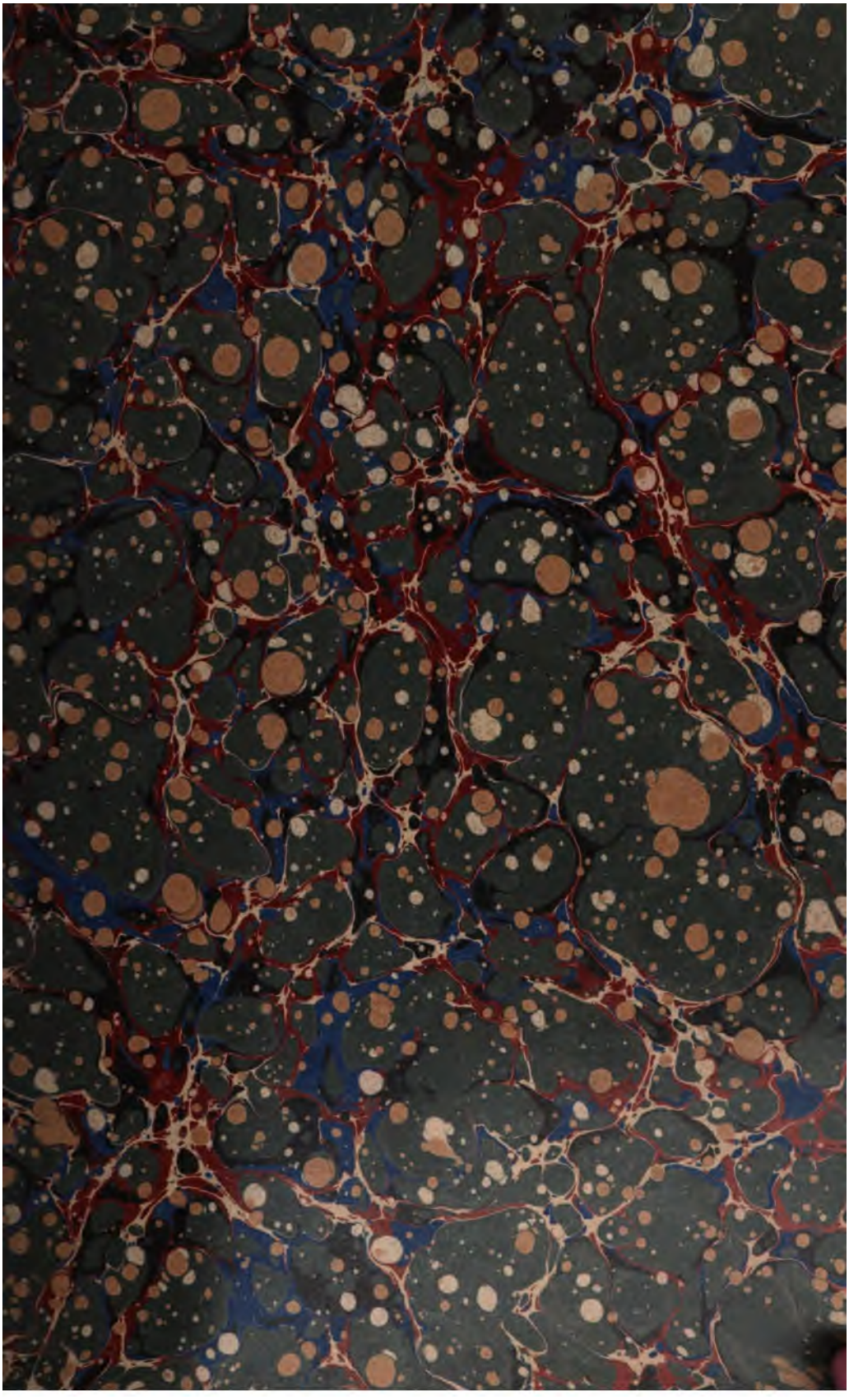

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THE MONIST.

THE REALITIES OF EXPERIENCE.

GREAT IN MANY WAYS, Huxley was perhaps greatest as an essayist. To this end he applied three conspicuous gifts, —an eye for essentials, lucidity of thought, and style. Original research had provided him with a solid basis of first-hand knowledge in his special branch of science. Wide reading and a tenacious memory furnished him with abundant material for apt and forcible illustration. He knew the public whom he addressed and felt its pulse with admirable skill. He had a mission and a message. He stood forth as the champion of science and of a negative philosophy founded thereon. It is one aspect of that philosophy I propose to consider.

Towards the close of the essay on Descartes's *Discourse on Method* Huxley said:[1]

> "The reconciliation of physics and metaphysics lies in the acknowledgment of faults upon both sides; in the confession by physics that all the phenomena of nature are in their ultimate analysis known to us only as facts of consciousness; in the admission by metaphysics that the facts of consciousness are, practically, interpretable only by the methods and the formulæ of physics; and, finally, in the observance by both metaphysical and physical thinkers of Descartes's maxim—assent to no proposition the matter of which is not so clear and distinct that it cannot be doubted."

In two subsequent essays, and elsewhere incidentally, Huxley interpreted and fully accepted the Berkeleyan analysis of sensation

[1] *Collected Essays*, I. p. 194.

and perception. Starting with the prick of a pin, which subtly transforms itself on the next page into a needle, and passing to the smell, taste, and visible appearance of the orange, without which, as part of his stock in trade, no one who has a due respect for tradition would attempt to deal with the problem, he leads up to the position which Locke thus summarised:[1]

"Flame is denominated hot and light; snow, white and cold; and manna, white and sweet, from the ideas they produce in us; which qualities are commonly thought to be the same in these bodies that those ideas are in us; the one the perfect resemblance of the other as they are in a mirror; and it would by most men be judged very extravagant if one should say otherwise. And yet, he that will consider that the same fire that at one distance produces in us the sensation of warmth, does at a nearer approach produce in us the far different sensation of pain, ought to bethink himself what reason he has to say that his idea of warmth which was produced in him by the fire, is actually in the fire; and his idea of pain which the same fire produced in him in the same way, is not in the fire. Why are whiteness and coldness in snow, and pain not, when it produces the one and the other idea in us; and can do neither but by the bulk, figure, number, and motion of its solid parts?"

Having thus, in company with Locke, disposed of any claim to external reality which these so-called "secondary qualities" may be supposed to possess, Huxley then proceeds to apply the Berkeleyan logic to the "primary qualities." Locke had said:[2]

"The particular bulk, number, figure, and motion of the parts of fire and snow are really in them, whether any one's senses perceives them or not, and therefore they may be called real qualities because they really exist in those bodies; but light, heat, whiteness or coldness are no more really in them than sickness or pain is in manna. Take away the sensation of them; let not the eyes see light or colors, nor the ears hear sounds; let the palate not taste nor the nose smell; and all colors, tastes, odors, and sounds, as they are such particular ideas, vanish and cease, and are reduced to their causes, i. e., bulk, figure, and motion of parts."

But as Huxley, interpreting Berkeley, goes on to show, a rigorous extension of the logic which disposes of the secondary qualities, forces us to admit that the primary qualities are in like condemnation. So that the final upshot is this:

---

[1] Quoted in *Collected Essays*, Vol. VI. pp. 253–254.

[2] Quoted Vol. VI. p. 255.

"If the materialist affirms that the universe and all its phenomena are resolvable into matter and motion, Berkeley replies: 'True; but what you call matter and motion are known to us only as forms of consciousness; their being is to be conceived or known; and the existence of a state of consciousness, apart from a thinking mind, is a contradiction in terms.' (P. 279.)

"Our sensations, our pleasures, our pains, and the relations of them make up the sum total of positive, unquestionable knowledge. We call a large section of these sensations and their relations matter and motion; the rest we term mind and thinking; and experience shows that there is a constant order of succession between some of the former and some of the latter." (P. 318.)

Now, when having closed the book and looking up, one sees a bunch of purple violets, delicately formed, sweetly scented, in the vase out there on the table, one is tempted to wonder whether, in following the lead of Locke and Berkeley, the high priest, or if it be preferred the proctor, of modern science, took the line most suitable for the end he had in view. That end was first the delimitation of scientific knowledge, and secondly the disclosure of the foundations on which that knowledge is securely based. Both the range and the basis may be summarised, on the principles he adopts, in the single word Experience. Beyond experience we are not to stray; and the clear teachings of experience we are to trust with absolute confidence.

"The memorable service rendered to the cause of sound thinking by Descartes,' said Huxley, "consisted in this: that he laid the foundation of modern philosophical criticism by his inquiry into the nature of certainty. It is a clear result of the investigation started by Descartes, that there is one thing of which no doubt can be entertained, for he who should pretend to doubt it would thereby prove its existence; and that is the momentary consciousness we call a present thought or feeling; that is safe, even if all other kinds of certainty are merely more or less probable inferences." (VI. 65, 6.)

For my own part I confess that when, having closed the book, or awakened from the metaphysical reverie it has suggested, I see before me the bunch of violets, nothing in the whole range of my experience appears to be more certain and clear than the reality *in all its details*, of this present item of immediate perception. If I am to accept the Cartesian maxim, here and now is my opportunity. Suppose that a physicist at my side undertakes to show that

what I call the color of the violets is explicable in terms of matter and motion; I listen with respectful attention. But, granting that every step of his argument conforms strictly to the Cartesian canon, it is none the less true that every step takes us farther from the particular reality of immediate experience from which we started. No doubt, our path may lead us to new realities of physical thought and inference. That I do not deny; what I deny is that our journeying from the Land's End to Berwick-on-Tweed has altered one whit the reality of our experiences at the outset of our journey. And if the mental philosopher then offers to be my guide through the country of Hume, I am delighted to be his companion right up to John o' Groat's. I rejoice to travel in such excellent company. But when we get there, when not only the Land's End violets but the matter and motion of Berwick have faded in the indefinite distance, and become but pleasant memories, it appears to me that though we have taken many more steps and journeyed further from our starting-point, and though what we see at John o' Groat's (with a good pair of metaphysical spectacles) may be quite clear and real, yet,—there is our bunch of violets on the table. We have passed from the realities of immediate perception to the realities of physics and thence to the realities of Berkeleyan thought: but don't try and persuade us that these realities of abstraction carry with them more certitude than the immediate experience with which we started. I profess that, being but a plain man, the reality of my experience, as I look at the bunch of violets, carries with it the very maximum of conviction. And it appears to me that, on the principles of Descartes's himself, we should substitute for his celebrated *Cogito ergo sum*, concerning which as it stands very pretty arguments have arisen, the indisputable axiom *Experientia est.*

There are some, however, who would seek to undermine the foundations of this belief. Mr. Balfour, for example, interprets the teaching of Naturalism as follows:

"Whereas common sense tells us that our experience of objects provides us with a knowledge of their nature which so far as it goes, is immediate and direct, science informs us that each particular experience is itself but the final link in a long chain of causes and effects, whose beginning is lost amid the complexities of

the material world, and whose ending is a change of some sort in the mind of the percipient. It informs us further, that among these innumerable causes, the thing 'immediately experienced' is but one; and is, moreover, one separated from the 'immediate experience' which it modestly assists in producing by a very large number of intermediate causes which are never experienced at all. . . . The fact that even the most immediate experiences carry with them no inherent guarantee of their veracity is, however, by far the smallest of the difficulties which emerge from a comparison of the causal movement from object to perception, with the cognitive leap from perception to object. . . . For we need only to consider carefully our perceptions regarded as psychological results, in order to see that, regarded as sources of information, they are not merely occasionally inaccurate, but habitually mendacious. We are dealing, recollect, with a theory of science according to which the ultimate stress of scientific proof is thrown wholly upon our immediate perceptions of objects. But nine-tenths of our immediate experiences of objects are visual; and all visual experiences, without exception, are, according to science, erroneous. As everybody knows, color is not a property of the thing seen: it is a sensation produced in us by that thing. The thing itself consists of uncolored particles, which become visible solely in consequence of their power of either producing or reflecting ethereal undulations. The degrees of brightness and the qualities of color perceived in the thing, and in virtue of which alone any visual perception of the thing is possible, are therefore according to optics, no part of its reality, but are feelings produced in the mind of the percipient by the complex movements of material molecules, possessing mass and extension, but to which it is not only incorrect but unmeaning to attribute brightness or color."[1]

Mr. Balfour would seem to have written this near Berwick-on-Tweed. But we must remember that he is merely interpreting what he assumes to be the creed of science. According to this creed, thus interpreted, our experiences at the Land's end were naught but an illusory dream. I refuse to admit the physical scenery of this interpretation, real enough in its proper place, as a substitute for the equally real scenery of direct perception. The Land's end of immediate experience from which Mr. Balfour starts is a green tree standing in the next field. And I claim that this green tree is not a whit less real than "the complex movements of material molecules, possessing mass and extension" which come into view at Berwick. We are not dealing at present, remember, with any of the inferences which may be drawn from the original expe-

[1] *Foundations of Belief*, pp. 108, 111, 112.

rience,—with any judgment about the object. These may be true or false without affecting one jot the reality of the experience as such. We are not regarding the experience as a message. It may be true that, as Mr. Balfour says:

"Anything which would distribute similar green rays on the retina of the eyes in the same pattern as that produced by the tree, or anything that would produce a like modification of the cerebral tissues, would give an experience in itself quite indistinguishable from the experience of the tree, although it [nay, Sir, not it but our interpretation of it] has the unfortunate peculiarity of being wholly incorrect The same message would be delivered, in the same terms and on the same authority, but it would be false."

Be it true or false, however, as a message,—as an experience it is unquestionably real. We either have it or do not. If we have it, it is real in the only intelligible meaning of this much abused word as applied in the affairs of practical life. We have established our asylums for those whose terribly real experiences habitually deliver false messages, that is to say messages which are for you and me and other normal people unverifiable and incorrect. It is of course open to some one to elaborate the thesis that we are all mad, and that this world in which we live is a glorified Bedlam. If so all we can do is to clap him into an asylum for the sane, and treat him kindly. It is on the validity of normal experience that we must take our stand.

Perhaps it may seem somewhat arbitrary to select certain experience, label it normal, and assert that it is on this selected reality that we must take our stand. The distinction, however, is between reality and validity. All experience, normal and abnormal alike, is real; but it is not all of the same social validity. If a lad come in on a dark night with blanched cheeks and trembling limbs saying that he has seen a ghost in the lane, his experience was real —appallingly real—but it lacks social validity. He stoutly contends that if you dare face it you too will see the spectre standing by the bank. Curiosity impels you to go; and you find a sheet of the *Daily Telegraph* blown by the wind against the hedge. The experience was real, but it was falsely interpreted. The dagger Macbeth saw was for him as real as immediate experience could make

it: but the phantom of his overwrought brain had no social validity, since for others there was but vacant air. The value of experience is as the guide to action. It generates anticipations; and only in so far as these anticipations are verifiable by others is it not only real but valid.

This leads us on to our next point. What is true of *an* immediate experience is true of any given series. Their reality lies in their being experienced. There is the tree in yonder green field. If I walk to it, touch it, inhale the fragrance of its blossoms, or, later in the season, enjoy the flavor of its fruit; if I run a splinter from it into my finger, or foolishly knock my head against its boughs; if I measure its height or calculate its value; in all of this there is a sequence of experiences, each of which is real for me just in so far as it is an actual experience. And we are able to guide our actions and walk more or less sure-footedly in the paths of experience, just because, as experience itself shows, the realm we have been exploring is an orderly realm,—orderly not only for me but for you. For you and I can compare notes as to our experience, whence emerges natural knowledge.

All of this seems, no doubt, to many very elementary and trite. We know perfectly well, it may be said, that out there in the field is a tree; that if one is near enough one can see it, and if one goes still nearer one can handle it and taste its fruits. There is no need to tell us that the orderly sequence of experience is the result of two quite independent things,—our consciousness and the tree. That is mere common sense. But it must be remembered that common sense is a subtle compound of practical experience and crude metaphysics. The assumption that the unity of experience is the product of two independent factors, the tree and consciousness, is a metaphysical assumption, and one which leads to all sorts of difficulties. It forces you to divide the experience between the two existences. You will perhaps begin, with Locke, by admitting that the color, and the sweetness, and the pain are in your consciousness, while matter and extension are in the tree. Then you may be perplexed, like readers of Huxley, with horrid doubts about the matter and extension as they exist independently

of the percipient mind. And you may end with the conviction that "what we are conscious of as properties of matter, even down to its weight and resistance, are but subjective affections produced by objective agencies which are unknown and unknowable;" and may be enfolded at last with the lambs that Mr. Herbert Spencer feeds with the metaphysical grass of transfigured Realism. Which Heaven forbid! for the unknowable is innutritious provender.

But surely, the tree as object and the mind as subject are distinguishable with Cartesian clearness. Distinguishable, yes—like the scent and color of my violets. But it does not follow that they are separable. In experience they are inseparable; and if we postulate independence, we do so on metaphysical grounds. Let us go back to the immediate experience which I describe as a green tree in the field. This is our starting point. Now what we do is to analyse this bit of practical experience. And as the result of our analysis we distinguish in thought what philosophers have agreed to call an objective aspect, the green tree, and a subjective aspect, our perception. In experience the two are inseparable. And a system of science which is founded on experience should frankly accept its limitations and leave outstanding problems to metaphysics. If we do this; if we hold firmly, as students of science, to the teachings of experience and refuse, within the sphere of science, to go beyond them; if we be careful to avoid the pernicious fallacy, that what is distinguishable in analysis is necessarily separable in existence; then our way is comparatively clear and simple. Looking at our experience in its objective bearings, we elaborate a system of natural and physical science; looking at it in its subjective bearings, we elaborate a co-ordinate system of mental science. The question whether the color is in the tree or in our mind, admits of no answer from science, just because it is wrongly stated. It is formulated in terms of the crude dualistic metaphysics of common sense. Asked in an intelligible form for science, it admits of a perfectly intelligible answer. The color is certainly part of the objective aspect of vision and has to be investigated by natural and physical science; it, as unquestionably, has a bearing on the subjective interpretation of experience, and from this point of

view falls within the province of the psychologist. The distance of the tree, its size, its value, fall, in like manner, within the scheme of objective interpretation, from one point of view, and within the scheme of subjective interpretation from the other; and that because as items of experience they are susceptible of this mode of analysis.

For science both aspects, objective and subjective, are absolutely co-equal and co-ordinate in the matter of reality. It is just as absurd to deny objective reality as to deny the reality of experience; the one implies the other. Science, I repeat, takes its stand on this reality of experience; polarises it under the magnetic influence of thought; terms all that falls within the objective purview the natural and physical universe, and all that falls under the subjective analysis the world of mind; regarding both as co-ordinate realities, or, rather, coequal aspects of the basal reality of experience.

But it may be said that the immediate experience of the bunch of violets, or the green tree in the field, carries with it the ineradicable conviction that the object is independent of the subject. In what sense independent? If we cross-question practical experience, apart from the metaphysics of common sense, does it assert with conviction anything beyond the range of actual or possible observation or of verifiable inference founded thereon? I cannot discover that it does. Experience begets expectations, and the reiterated verification of such expectations does carry with it a sort of conviction. I am convinced that if I reach forth my hand to the violets and carry them to my nose, I shall experience their fragrance. I do not wish in any degree to minimise the force and value of such convictions. They are our guides in the practical conduct of life. Without them we could make no advances in science. At the same time these expectations *may be* misleading. The violets may be artificial and have been placed on my table as a practical joke. Or they may be dog-violets. The order of certainty—if the expression be allowed—of the immediate experience, as such, is different from that of any expectation, no matter how well founded. *Experientia*

erit cannot be asserted with the same absolute confidence as *Experientia est.*

Now, so far as I can ascertain, practical knowledge, apart from metaphysics, never goes beyond the assertion that experience, actual or possible, is, was, or will be, of such and such a kind. It asserts on the evidence of Geology that *Ichthyosauri* lived in the seas of Liassic times, and that, had men been living then, there would have been such and such experiences. It asserts that in the experience of the future, as in that of to-day, sunrise and sunset will continue so long as the solar system shall endure. All past history, all anticipations for the future, it presents in the form of actual or possible experience. But if we ask questions which do not admit of answers couched in terms of experience, inquiring, for example, what will be the state of matters if experience, actual or possible, is from the nature of the case excluded, then common sense either refuses to give any reply, or has resort to metaphysical assumptions. It is apt to assume, for instance, that because *my* experience, say of the bunch of violets, is independent of you, and *yours* of me, and *ours* of some actual or possible third person, the object, as such, is independent of *any* experience. That there may be something independent of any experience, I am not concerned here either to assert or to deny. Such assertion or denial must be based on metaphysical grounds altogether beyond the domain of actual observation. For the practical affairs of life the word "object" indicates that which is given in sensory experience. Begotten thus of experience, the object should resent any doubts which may be thrown on its legitimate parentage. I cannot believe that common sense ever seriously means to cast this slur on the objects of perception. It asserts that under given conditions of experience you or I, or any one else, may see and handle the violets—that as objects they are independent of any of us severally, not surely that they exist, as such, independently of all experience.

But is not this complete independence implied in our words and forms of speech? Not necessarily. The function of language is to enable us to communicate to each other, or to record, the results of experience and of thought. Their implications are either

practical or metaphysical. Absolute independence is a metaphysical implication, and differs from that practical independence which is a matter of common experience. If some one tells me that there are mile-stones on the Dover road, and that if I care to journey thither I shall see them, he expresses first a fact of experience, and secondly an anticipation based thereon. It is true that I or any one else can verify my informant's anticipation. This shows that the object is independent of merely individual experience, but it does not show, nor does our language necessarily imply, that, as objects, the mile-stones are independent of all experience. And if it be said that some thing, at any rate, does exist independently which generates or is the occasion of the several experiences of those who journey along the Dover road, I am certainly not prepared to deny the statement; but it belongs to the domain of metaphysics, not to that of practical knowledge. To the question, What is the cause of the experience in which you trust? practical knowledge, apart from metaphysics, replies: That is outside my province. What information I have is entirely based on observation. I can offer no opinion on matters which lie behind and beyond it.

I conceive that science, in so far as it is founded on practical experience, should make precisely the same answer. No doubt science has carried its inferences much further afield. It deals in greater degree with generalisations and employs more largely the symbolism of abstraction. It soars on the wings of thought to more lofty and difficult heights. For it must not be forgotten that the realm of experience includes not only the domain of the senses, but all that can logically, with the Cartesian canon in view, be founded thereon.

"Indeed the domain of the senses," as Tyndall said, "is almost infinitely small in comparison with the vast region accessible to thought which lies beyond them. From a few observations of a comet when it comes within the range of his telescope, an astronomer can calculate its path in regions which no telescope can reach; and in like manner, by means of data furnished in the narrow world of the senses, we make ourselves at home in other and wider worlds, which can be traversed by the intellect alone."

Just as the trigonometrical survey of a whole continent may be constructed from a single accurately measured base-line, so may we construct the vast extra-sensible world of science from the accurately measured base-line of sensible experience. Science does but indefinitely prolong and extend the process of inference which common sense habitually employs in dealing with daily affairs. And only by oft-repeated reference to the touchstone of experience is the gold of valid inference distinguishable from the false coinage and spurious notes of fallacy.

There is, however, another feature of scientific knowledge which is perhaps more frequently overlooked. It is founded on selected experience. Although from the subjective aspect abnormal experience forms an important field for investigation, yet, in its objective aspect, science is forced to exclude it altogether. And not only is abnormal experience necessarily ignored (for it has no social validity), but all observations which fail to reach the standard of accuracy and exactness which science imposes, are for that reason excluded. There is also a tendency, wise in the main but apt to be arbitrary, to deny the validity of all such experience as fails to conform to the existing conclusions of science—to ignore whatsoever seems to be discordant with our scheme of scientific interpretation. This may perhaps be regarded as the besetting intellectual sin of the narrow-minded devotee of science. It is a defect which time and increased wisdom will remedy. The ideal towards which we work should be that all sane and accurate experience shall find its appropriate place in the system of scientific knowledge.

The result, then, of the analysis of this extended system founded and built on experience, is to polarise it into objective and subjective, one in essence but diverse in aspect, of neither of which do we know anything apart from the other, both of strictly co-ordinate reality within the system. Under the objective aspect we classify all that we learn from astronomy, geology, biology, physics, and chemistry, concerning the material universe. The planets of the solar system, the rocks of the carboniferous age, the delicate pencillings on the guinea-fowl's plumage, the chasing on

the minutest diatom, are in no sense less real, for experience, than the orderly molecular or atomic evolutions of which the physicist or the chemist has to tell us. Men of science who are concerned with the objective take for granted the subjective aspect which all experience, as such, must present. That they leave to those whose business it is to deal with our knowledge from this point of view—to the psychologists, who regard the whole realm of experience as that which affords data for the understanding of the orderly sequence of states of consciousnesss. Psychologists take cognisance of the objective, not for its own sake, but as inevitably throwing light on those conscious processes which they have to explain in terms of their special science. Thus by an organised division of labor naturalists and psychologists extend the systematic survey, each from his selected point of view; and thus by analysis are disentangled the strands which constitute the intricately-woven tapestry of human experience; thus, too, in synthetic interpretation, does the student of history, whether of our own times or of a more distant past, utilise all that is rendered visible from each standpoint, and combine actions and motives in one dramatic representation.

Let us, however, in surveying the edifice of human knowledge, be careful not to lose sight of the foundations. These are the common experiences of daily life—the data afforded by observation. Just in so far as these are real and valid, will the superstructure have reality and validity. Any system of thought which conveys the notion that they are tainted with unreality is false to the principles of experience and of science. The corner-stone of the whole building has inscribed upon it the axiom *Experientia est.* If my experience of the bunch of violets be not real and trustworthy down to its minutest and apparently most trivial detail, then there is nothing in the vast system of scientific knowledge which can resist the solvent acid of philosophical scepticism, leaving but the phantom dregs of the Unknowable.

And so we come back to Huxley's line of argument founded on the Berkeleyan analysis. What shall we say of it? Is it true or false? Shall we evade the question and answer indirectly that

it is ill-chosen? Or may we not take refuge in an oxymoron? No one was more desirous than Huxley of doing honor to science. But in these Berkeleyan essays

> "His honor rooted in dishonor stood
> And faith unfaithful kept him falsely true."

If he wished to make a desert of the Unknowable so that the divine Astræa of philosophic peace should commence her blessed reign, he adopted a strangely ill-advised method of realising his desires. Hear again the words in which he summarises his conclusions:

> "Our sensations, our pleasures, our pains, and the relations of these make up the sum total of positive, unquestionable knowledge. We call a large section of these sensations and their relations matter and motion; the rest we term mind and thinking; and experience shows that there is a constant order of succession between some of the former and some of the latter."

I venture to deny the validity of this division into two separate sections, material and mental. The body of experience is one and homogeneous, and *every item* presents to analysis two aspects. But let that pass. The passage is open to a more serious criticism. Bearing in mind the way in which Huxley hunts down the objectivities, hounding first the secondary qualities, and then those once termed primary, until they take refuge in the safe haven of the subjective, is it unjust to paraphrase his conclusions as follows? Only the subjective aspect of experience can make good at the bar of reason its title to reality: the objective universe is at best but an orderly mental phantasmagoria.

Now this conclusion came naturally enough from the lips of a professed mental philosopher like Berkeley. It was indeed a one-sided conclusion. It was elaborated in the subjective field; but it exercised in its own proper sphere no little influence on the development of modern philosophic thought. It established triumphantly the subjective aspect as present in all experience throughout its whole range. And if in its vivid realisation of this aspect it seemed to minimise the value of the correlative objective aspect, the fault may well be condoned—in Berkeley. With Huxley the case is different. What was seemly, nay admissible, in the Bishop

of Cloyne may scarcely befit the proctor of modern science. I have a sincere admiration of Huxley's work and genius. But when, having discoursed with enviable lucidity on the physical basis of life and mind, he finally merges the object in the subject, he is no longer true to the flag of experience under which he professed to serve. The following words are the utterance of a deserter: "If I say that thought is a property of matter, all that I can mean is that actually or possibly the consciousness of extension and that of resistance accompany all other sorts of consciousness." The idealism of the explanation is as absurd as the materialism it professes to explain. Does any true soldier of science believe that his captain here spoke wisely and well? I for one must protest, even if I be drummed out of the service for sowing the seeds of disaffection to a superior officer whose memory is justly revered. But before I am ignominiously stripped of my uniform I must repeat that the objective and the subjective are the co-ordinate products of the analysis of experience, and that the one is as real (and real in precisely the same sense) as the other. If we polarise the experience of a bunch of flowers into objective violets and subjective states of consciousness, we cannot doubt the reality of either without deny- the reality of the experience thus polarised.

And what good purpose, it may be asked, can be served by this discussion? The question at issue is of very little if any practical moment. Notwithstanding all that the Bishop of Cloyne and the philosopher of Ninewells have written, in spite of the arguments of their spiritual progenitor Locke and their nineteenth-century interpreter Huxley, men of science have quietly and steadily pursued their researches, and the general public have accepted and profited by their labors without misgivings. But if we found our knowledge on experience, we must be prepared either to hold Huxley's position or to abandon it and occupy more advantageous ground. No doubt in times of peace we may be content to retain the position in a merely formal manner, without considering its strength or its weakness. It will then afford no little gratification to onlookers when in times of attack the enemy's shot destroy our crumbling walls and force us to beat a retreat. If one may judge from the

comments of the press, this was the attitude of many, when Mr. Balfour opened a vigorous and well-directed fire on what seemed to the field-glasses of the attacking party the chief positions of naturalism.

Choosing his ground with all the skill of a trained dialectician, and selecting for his most concentrated fire a position in itself inherently weak, Mr. Balfour affords to onlookers a view of some very pretty artillery practice:

"Naturalism (as commonly held), he says, is deeply committed to the distinction between the *primary* and the *secondary* qualities of matter; the former (extension, solidity, and so forth) being supposed to exist as they are perceived, while the latter (such as sound and color) are due to the action of the primary qualities upon the sentient organism, and apart from the sentient organism have no independent being." (*Foundations of Belief*, p. 42.)

Then, in the passage already quoted, he argues that, on this view, our perceptions regarded as sources of information, are not merely occasionally inaccurate but habitually mendacious. And a little further on he asks:

"By what possible title can we proclaim the same immediate experience to be right when it testifies to the independent reality of something solid and extended, and to be wrong when it testifies to the independent reality of something illuminated and colored." (P. 113.)

Having captured this position and advanced on one more closely resembling that strengthened and fortified by Huxley, he places a telling shot when he says that—

"It involves a complete divorce between the practice of science and its theory. It is all very well," he continues, "to say that the scientific account of mental physiology in general, and of sense-perception in particular, requires us to hold that what is immediately experienced are mental facts, and that our knowledge of physical facts is but mediate and inferential. Such a conclusion is quite out of harmony with its own premises, since the proposition on which, as a matter of historical verity, science is ultimately founded are not propositions about states of mind, but about material things. . . . So that, if this particular account of the nature of experience be accurate, the system of thought represented by science presents the singular spectacle of a creed which is believed in practice for one set of reasons, though in theory it can only be justified by another; and which, through some beneficent accident, turns out to be true, though its origin and each subsequent stage in its gradual development are the product of error and illusion."

Finally surveying the ruins of the captured fort, Mr. Balfour exclaims:

"Nothing in the history of speculation is more astonishing, nothing—if I am to speak my whole mind—is more absurd than the way in which Hume's philosophic progeny—a most distinguished race—have, in spite of all their differences, yet been able to agree, *both* that experience is essentially as Hume described it, *and* that from such an experience can be rationally extracted anything even in the remotest degree resembling the existing system of the natural sciences." (Pp. 96, 97.)

I have recalled to the reader's memory these strategic advances of a powerful and avowed enemy to Naturalism as a philosophy, partly with the object of showing that the position in which Huxley entrenched himself was regarded by one who had no narrow and petty cause to fight for, as a position of importance and worth capturing, and partly with a view to indicating that Mr. Balfour's logical projectiles have not pierced or weakened the central citadel of experience. For if there be any truth in the conclusions set forth in the preceding pages, Mr. Balfour has only succeeded in taking outposts which the captains of experience should never have occupied. If he have forced the soldiers of science to fall back upon more tenable ground, and compelled them to defend the co-ordinate reality of the objective and subjective in all their details, he will, in my judgment, have done them a signal service. The position of naturalism will be the stronger for his spirited attack.

By naturalism I here mean a system of knowledge founded on experience in its widest and most comprehensive sense. Within that system experience may be trusted implicitely as far as it goes —and no farther. Although it may occasionally lead to false inferences, it is not habitually inaccurate, still less mendacious. Only when dealing with problems outside its proper sphere does it talk nonsense. It is by no means a complete system of knowledge, but is full of gaps, and ends off in ragged edges. It does not afford an explanation of the universe. Nay, I am prepared to go further and assert that experience does not and cannot furnish a philosophical explanation of anything, its rôle being to describe the past and anticipate the future. It deals with sequences which, under the

appropriate conditions, it finds to be practically invariable. And if it commonly speaks of the causes of events, when it should be content with describing their antecedents, it is but borrowing, consciously or unconsciously, the language of metaphysics. Experience of past sequences enables us to predict the future in similar terms. There its guidance ceases. In presence of the problem of causation it is smitten with the dumbness of agnosticism.

And beyond the babble of experience all is silence! On what men of thought in all ages have regarded as the deepest problems of existence we are to ask no questions, or at any rate are to expect no answers! I, for one, am unable to assent to these propositions. I do indeed contend that the whole edifice of scientific knowledge is securely founded on the realities of experience. If, however, I be asked whether I am content to accept the universe as inexplicable, I have no hesitation in replying that I am not. Behind the sequential realities of experience I believe in a causal reality which makes that experience possible and explicable. But, as Mr. Rudyard Kipling would say, that is another story.

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ISOLATION IN ORGANIC EVOLUTION.

A POSTHUMOUS ESSAY BY THE LATE GEORGE JOHN ROMANES

THE PRESENT ARTICLE will be devoted to the consideration of what, in my opinion, is one of the most important principles that are concerned in the process of organic evolution—namely, Isolation. I say in *my* opinion such is the case, because, although the importance of isolation is more or less recognised by every naturalist, I know of only one other who has perceived all that the principle involves. This naturalist is the Rev. J. Gulick, and to his essays on the subject I attribute a higher value than to any other work in the field of Darwinian thought since the date of Darwin's death.[1] For it is now my matured conviction that a new point of departure has here been taken in the philosophy of Darwinism, and one which opens up new territories for scientific exploration of an endlessly wide and varied character. Indeed I believe, with Mr. Gulick, that in the principle of Isolation we have a principle so fundamental and so universal, that even the great principle of Natural Selection lies less deep, and pervades a region of smaller extent. Equalled only in its importance by the two basal principles of Heredity and Variation, this principle of Isolation constitutes the third pillar of a tripod on which is reared the whole superstructure of organic evolution.

By isolation I mean simply the prevention of intercrossing between a separated section of a species or kind and the rest of that

[1] It will be remembered that I regard Weismann's theory of heredity, with all its deductive consequences, as still *sub judice*.

species or kind. Whether such a separation be due to geographical barriers, to migration, or to any other state of matters leading to exclusive breeding within the separated group, I shall indifferently employ the term isolation for the purpose of designating what in all cases is the same result—namely, a prevention of intercrossing between A and B, where A is the separated portion and B the rest of the species or kind.

The importance of isolation as against dissimilar forms has always been fully appreciated by breeders, fanciers, horticulturists, etc., who are therefore most careful to prevent their pedigree productions from intercrossing with any other stock. Isolation is indeed, as Darwin has observed, "the corner-stone of the breeder's art." And similarly with plants and animals in a state of nature: unless intercrossing with allied (i. e., dissimilar) forms is prevented, the principle of heredity is bound to work for uniformity, by blending the dissimilar types in one: only when there is exclusive breeding of similarly modified forms can the principle of heredity work in the direction of change—i. e., of evolution.

Now, the forms of isolation—or the conditions which may lead to exclusive breeding—are manifold. One of the most important, as well as the most obvious, is geographical isolation; and no one questions that this has been an important factor in the process of evolution, although opinions still vary greatly as to the degree of its importance in this respect. At one end of the series we may place the opinion of Mr. Wallace, who denies that any of what may be termed the evolutionary effect of geographical isolation is due to "influence exerted by isolation *per se*." This effect, he says, is to be ascribed exclusively to the fact that a geographically isolated portion of a species must always encounter a change of environment, and therefore a new set of conditions necessitating a new set of adaptations at the hands of natural selection.[1] At the other end of the series we must place the opinion of Moritz Wagner, who many years ago published a masterly essay,[2] the object of which

[1] *Darwinism*, p. 150.

[2] *The Darwinian Theory, and the Law of Migration* (Eng. Trans., Stanford, London, 1873.)

was to prove that, in the absence of geographical isolation (including migration), natural selection would be powerless to effect any change of specific type. For, he argued, the initial variations on which the action of this principle depends would otherwise be inevitably swamped by free intercrossing. Wagner adduced a large number of interesting facts in support of this opinion; but although he thus succeeded in enforcing the truth that geographical isolation is an important aid to organic evolution, he failed to establish his conclusion that it is an indispensable condition. Nevertheless, he may have been right—and, as I shall presently show, I believe he was right—in his fundamental premiss, that in the presence of free intercrossing natural selection would be powerless to effect divergent evolution. Where he went wrong was in not perceiving that geographical isolation is not the only form of isolation. Had it occurred to him that there may be other forms quite as effectual for the prevention of free intercrossing, his essay could hardly have failed to mark an epoch in the history of Darwinism. But, on account of this oversight, he really weakened his main contention, namely, that in the presence of free intercrossing natural selection must be powerless to effect divergent evolution. This main contention I am now about to reargue. At present, therefore, we have only to observe that Wagner did it much more harm than good by neglecting to perceive that free intercrossing may be prevented in many other ways besides by migration, and by the intervention of geographical barriers.

In order that we may set out with clearer views upon this matter, I will make one or two preliminary remarks on the more general facts of isolation as these are found to occur in nature.

In the first place, it is obvious that isolation admits of degrees: it may be either total or partial; and, if partial, may occur in numberless grades of efficiency. This is so manifest that I need not wait to give illustrations. But now, in the second place, there is another general fact appertaining to isolation which is not so manifest, and a clear appreciation of which is so essential to any adequate consideration of the subject, that I believe the reason why evolutionists have hitherto failed to perceive the full importance of

isolation, is because they have failed to perceive the distinction which has now to be pointed out. The distinction is, that isolation may be either discriminate or indiscriminate. If it be discriminate, the isolation has reference to the resemblance of the separated individuals to one another; if it be indiscriminate, it has no such reference. For example, if a shepherd divides a flock of sheep without regard to their characters, he is isolating one section from the other indiscriminately; but if he places all the white sheep in one field, and all the black sheep in another field, he is isolating one section from the other discriminately. Or, if geological subsidence divides a species into two parts, the isolation will be indiscriminate; but if the separation be due to one of the sections developing, for example, a change of instinct determining migration to another area, or occupation of a different habitat on the same area, then the isolation will be discriminate, so far as the resemblance of instinct is concerned.

With the exception of Mr. Gulick, I cannot find that any other writer has hitherto stated this supremely important distinction between isolation as discriminate and indiscriminate. But he has fully as well as independently stated it, and shown in a masterly way its far-reaching consequences. Indiscriminate isolation he calls Separate Breeding, while discriminate isolation he calls Segregate Breeding. For the sake, however, of securing more descriptive terms, I will coin the words Apogamy and Homogamy. Apogamy, of course, answers to indiscriminate isolation, or separate breeding. Homogamy, on the other hand, answers to discriminate isolation, or segregate breeding: only individuals belonging to the same variety or kind are allowed to propagate. Isolation, then, is a genus, of which Apogamy and Homogamy are species.[1]

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[1] I may here most conveniently define the senses in which all the following terms will be used throughout the present discussion;—*Species* of isolation are, as above stated, homogamy and apogamy, or isolation as discriminate and indiscriminate. *Forms* of isolation are modes of isolation, such as the geographical, the sexual, the instinctive, or any other of the numerous means whereby isolation of either species may be secured. *Cases* of isolation are the instances in which any of the forms of isolation may be at work: thus, if a group of n intergenerants be segregated into five groups, a, b, c, d, e, then, before the segregation there would

Now, in order to appreciate the unsurpassed importance of isolation as one of the three basal principles of organic evolution, let us begin by considering the discriminate species of it, or Homogamy.

To state the case in the most general terms, we may say that if the other two basal principles are given in heredity and variability, the whole theory of organic evolution becomes neither more nor less than a theory of homogamy,—that is, a theory of the causes which lead to discriminate isolation, or the breeding of like with like to the exclusion of unlike. For the more we believe in heredity and variability as basal principles of organic evolution, the stronger must become our persuasion that discriminate breeding leads to divergence of type, while indiscriminate breeding leads to uniformity. This, in fact, is securely based on what we know from the experience supplied by artificial selection, which consists in the intentional mating of like with like to the exclusion of unlike.

The point, then, which in the first instance must be firmly fastened in our minds is this: so long as there is free intercrossing, heredity cancels variability and makes in favor of fixity of type. Only when assisted by some form of discriminate isolation, which determines the exclusive breeding of like with like, can heredity make in favor of change of type, or lead to what we understand by organic evolution.

Now, the forms of discriminate isolation, or homogamy, are very numerous. When, for example, any section of a species adopts somewhat different habits of life, or occupies a somewhat different station in the economy of nature, homogamy arises within that section. There are forms of homogamy on which Darwin has laid great stress, as we shall presently find. Again, when for these or any other reasons a section of a species becomes in any small degree modified as to form or color, if the species happens to be one where any psychological preference in pairing can be exercised—as is very generally the case among the higher animals—exclusive breeding is apt to ensue as a result of such preference; for there is

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have been one case of isolation, but after the segregation there would be five such cases.

abundant evidence to show that, both in birds and mammals, sexual selection is usually opposed to the intercrossing of dissimilar varieties. Once more, in the case of plants, intercrossing of dissimilar varieties may be prevented by any slight difference in their seasons of flowering, of topographical stations, or even, in the case of flowers which depend on insects for their fertilisation, by differences in the instincts and preferences of their visitors.

But, without at present going into detail with regard to these different forms of discriminate isolation, there are still two others, both of which are of much greater importance than any that I have hitherto named. Indeed, these two forms are of such immeasurable importance, that were it not for their virtually ubiquitous operation, the process of organic evolution could never have begun, nor, having begun, continued.

The first of these two forms is sexual incompatibility—either partial or absolute—between different taxonomic groups. If all hares and rabbits, for example, were as fertile with one another as they are within their own respective species, there can be no doubt that sooner or later, and on common areas the two types would fuse into one. And similarly, if the bar of sterility could be thrown down as between all the species of a genus, or all the genera of a family, *not otherwise prevented from intercrossing*, in time all such species, or all such genera, would become blended into a single type. As a matter of fact, complete fertility, both of first crosses and of their resulting hybrids, is rare, even as between species of the same genus; while as between genera of the same family complete fertility does not appear ever to occur; and, of course, the same applies to all the higher taxonomic divisions. On the other hand, some degree of infertility is not unusual as between different varieties of the same species; and, wherever this is the case, it must clearly aid the further differentiation of those varieties. It will be my endeavor to show that in this latter connexion sexual incompatibility must be held to have taken an immensely important part in the differentiation of varieties into species. But meanwhile we have only to observe that *wherever* such incompatibility is concerned it is to be regarded as an isolating agency of the very

first importance. And as it is of a character purely physiological, I have assigned to it the name Physiological Isolation; while for the particular case where this general principle is concerned in the origination of specific types, I have reserved the name Physiological Selection.

The other most important form of discriminate isolation to which I have alluded is Natural Selection. To some evolutionists it has seemed paradoxical thus to regard natural selection as a form of isolation; but a little thought will suffice to show that such is really the most accurate way of regarding it. For, as Mr. Gulick says, "Natural selection is the exclusive breeding of those better adapted to the environment: . . . . it is a process in which the fittest are prevented from crossing with the less fitted, by the exclusion of the less fitted." Therefore it is, strictly and accurately, a mode of isolation, where the isolation has reference to adaptation, and is secured in the most effectual of possible ways,—i. e., by the destruction of all individuals whose intercrossing would interfere with the isolation. Indeed, the very term "natural *selection*" shows that the principle is tacitly understood to be one of isolation, because this name was assigned to the principle by Darwin for the express purpose of marking the analogy that obtains between it and the intentional isolation which is practised by breeders, fanciers, and horticulturists. The only difference between "natural selection" and "artificial selection" consists in this—that under the former process the excluded individuals must necessarily perish, while under the latter they need not do so. But clearly this difference is accidental: it is in no way essential to the process considered as a process of discriminate isolation. For, as far as homogamous breeding is concerned, it can matter nothing whether the exclusion of the dissimilar individuals is effected by separation or by death.

Natural selection, then, is thus unquestionably a form of isolation of the discriminate kind; and therefore, notwithstanding its unique importance in certain respects, considered as a principle of organic evolution it is less fundamental—and also less extensive—than the principle of isolation in general. In other words, it is but

a part of a much larger whole. It is but a particular form of a general principle, which, as just shown, presents many other forms, not only of the discriminate, but likewise of the indiscriminate kind. Or, reverting to the terminology of logic, it is a sub-species of the species Homogamy, which in its turn is but a constituent part of the genus Isolation.

So much then for homogamy, or isolation of the discriminate order. Passing on now to apogamy, or isolation of the indiscriminate kind, we may well be disposed, at first sight, to conclude that this kind of isolation can count for nothing in the process of evolution. For if the fundamental importance of isolation in the production of organic forms be due to its segregation of like with like, does it not follow that any form of isolation which is indiscriminate must fail to supply the very condition on which all the forms of discriminate isolation depend for their efficacy in the causing of organic evolution? Or, to return to our concrete example, is it not self-evident that the farmer who separated his stock into two or more parts indiscriminately, would not effect any more change in his stock than if he had left them all to breed together?

Well, although at first sight this seems self-evident, it is in fact untrue. For, unless the individuals which are indiscriminately isolated happen to be a very large number, sooner or later their progeny will come to differ from that of the parent type, or unisolated portion of the previous stock. And, of course, as soon as this change of type begins, the isolation ceases to be indiscriminate: the previous apogamy has been converted into homogamy, with the usual result of causing a divergence of type. The reason why progeny of an indiscriminately isolated section of an originally uniform stock—e. g., of a species—will eventually deviate from the original type is, to quote Mr. Gulick, as follows[1]:—"No two portions of a species possess exactly the same average character, and, therefore, the initial differences are for ever reacting on the environment and on each other in such a way as to ensure increasing

[1] *Divergent Evolution through Cumulative Segregation* (*Zool. Journal, Linn. Soc.*, Vol. XX., pp. 189–274).

divergence as long as the individuals of the two groups are kept from intergenerating." Or, as I stated this principle in my essay on *Physiological Selection*, published but a short time before Mr. Gulick's invaluable contributions to these topics:

> "As a matter of fact, we find that no one individual 'is like another all in all'; which is another way of saying that a specific type may be regarded as the average mean of all its individual variations, any considerable departure from this average being, however, checked by intercrossing. . . . Consequently, if from any cause a section of a species is prevented from intercrossing with the rest of its species, we might expect that new varieties should arise within that section, and that in time these varieties should pass into new species. And this is just what we do find."[1]

The name which I gave to this cause of specific change was Independent Variability, or variability in the absence of overwhelming intercrossing. But it now appears to me that this cause is really identical with that which was previously enunciated by Delbœuf. Again, in his important essay on *The Influence of Isolation*, Weismann concludes, on the basis of a large accumulation of facts, that the constancy of any given specific type "does not arise suddenly, but gradually, and is established by the promiscuous intercrossing of all individuals." From which, he says, it follows, that this constancy must cease so soon as the condition which maintains it ceases —i. e., so soon as intercrossing (Panmixia) between all individuals ceases, or so soon as a portion of a species is isolated from its parent stock. To this principle he assigns the name of Amixia. But Weismann's Amixia differs from my Independent Variability in several important particulars; and on this account I have designedly abstained from adopting his term. Here it is enough to remark that it answers to the generic term Isolation, without reference to the *kind* of isolation as discriminate or indiscriminate, homogamous or apogamous. On the other hand, my Independent

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[1] The passage proceeds to show that in view of this consideration we have a strong additional reason for rejecting the *a priori* dogma that all specific characters must necessarily be useful characters. For it is evident that any divergence of specific character which is brought about in this way need not present any utilitarian significance—although, of course, natural selection will ensure that it shall never be deleterious.

Variability is merely a restatement of the so-called "Law of Delbœuf," which, in his own words, is as follows:

"One point, however, is definitely attained. It is that the proposition, which further back we designated paradoxical, is rigorously true. A constant cause of variation, however insignificant it may be, changes the uniformity [of type] little by little, aad diversifies it *ad infinitum*. From the homogeneous, left to itself, only the homogeneous can proceed; but if there be a slight disturbance ['léger ferment'] in the homogeneous, the homogeneity will be invaded at a single point, differentiation will penetrate the whole, and, after a time—it may be an infinite time—the differentiation will have disintegrated it altogether."

In other words, the "Law," which Delbœuf has formulated on mathematical grounds, and with express reference to the question of segregate breeding, proves that, no matter how infinitesimally small the difference may be between the average qualities of an isolated section of a species compared with the average qualities of the rest of that species, if the isolation continues sufficiently long, differentiation of specific type is necessarily bound to ensue. But, to make this mathematical law biologically complete, it ought to be added that the time required for the change of type to supervene (supposing apogamy to be the only agent of change) will be governed by the range of individual variability which the species in question presents. A highly stable species (such as the Goose) might require an immensely long time for apogamy alone to produce any change of type in an isolated portion of the species, while a highly variable species (such as the Ruff) would rapidly change in any portion that might be indiscriminately isolated. It was in order to recognise this additional and very important factor that I chose the name Independent *Variability* whereby to designate the diversifying influence of merely indiscriminate isolation, or apogamy. Later on Mr. Gulick published his elaborate papers upon the divergence of type under all kinds of isolation; and retained my term Independent, but changed Variability into Generation. I point this out merely for the sake of remarking that his Independent Generation is exactly the same principle as my Independent Variability, and Delbœuf's Mathematical Law.

Now, while I fully agree with Mons. Giard where he says, in

the introductory lecture of his course on *The Factors of Evolution*,[1] that sufficient attention has not been hitherto given by naturalists to this important factor of organic evolution (apogamy), I think I have shown that among those naturalists who have considered it there is a sufficient amount of agreement. *Per contra*, I have to note the opinion of Mr. Wallace, who steadily maintains the impossibility of any cause other than natural selection (i. e., one of the forms of homogamy) having been concerned in the evolution of species. But at present it is enough to remark that even Professor Ray Lancaster—whose leanings of late years have been to the side of ultra-Darwinism, and who is therefore disposed to agree with Mr. Wallace wherever this is logically possible—even Professor Ray Lankaster observes:

"Mr. Wallace does not, in my judgment, give sufficient grounds for rejecting the proposition which he indicates as the main point of Mr. Gulick's valuable essay on *Divergent Evolution through Cumulative Segregation*. Mr. Gulick's idea is that . . . . no two portions of a species possess exactly the same average character, and the initial differences will, if the individuals of the two groups are kept from intercrossing, assert themselves continuously by heredity in such a way as to ensure an increasing divergence of the forms belonging to the groups, amounting to what is recognised as specific distinction. Mr. Gulick's idea is simply the recognition of a permanence or persistency in heredity, which, *caeteris paribus*, gives a twist or direction to the variations of the descendants of one individual as compared with the descendants of another."[2]

Now we have seen that "Mr. Gulick's idea," although independently conceived by him, had been several times propounded before; and it is partly implicated in more than one passage of the *Origin of Species*, where free intercrossing, or the *absence* of isolation, is alluded to as maintaining the *constancy* of a specific type.[3] Moreover, it is still more fully recognised in the last edition of the *Variation of Animals and Plants*, where a paragraph is added for the purpose of sanctioning the principle in the imperfect form that it was stated by Weismann.[4] Nevertheless, to Mr. Gulick belongs the credit, not only of having been the first to conceive (though

[1] *Revue Scientifique*, Nov. 23, 1889. [2] *Nature*, Oct. 10, 1889, p. 368.
[3] *E. g.*, p. 81. [4] See Chapter xxiii, vol. ii, p. 262. (Edition of 1888.)

the last to publish) the "idea" in question, and of having stated it with greater fulness than anybody else; but still more of having verified its importance as a factor of organic evolution.

For, in point of fact, Mr. Gulick was led to his recognition of the principle in question, not by any deductive reasoning from general principles, but by his own particular and detailed observations of the land mollusca of the Sandwich Islands. Here there are an immense number of varieties belonging to several genera; but every variety is restricted, not merely to the same island, but actually to the same valley. Moreover, on tracing this fauna from valley to valley, it is apparent that a slight variation in the occupants of valley 2 as compared with those of the adjacent valley 1, becomes more pronounced in the next—valley 3, still more so in 4, etc., etc. Thus it was possible, as Mr. Gulick says, roughly to estimate the amount of divergence between the occupants of any two given valleys by measuring the number of miles between them.

As already stated, I have myself examined his wonderful collection of shells, together with a topographical map of the district; and therefore I am in a position to testify to the great value of Mr. Gulick's work in this connexion, as in that of the utility question previously considered. The variations, which affect scores of species, and themselves eventually run into fully specific distinctions, are all more or less finely graduated as they pass from one isolated region to the next; and they have reference to changes of form and color, which in no one case presents any appearance of utility. Therefore—and especially in view of the fact that, as far as he could ascertain, the environment in the different valleys was essentially the same—no one who examines this collection can wonder that Mr. Gulick attributes the results which he has observed to the influence of apogamy alone, without any reference to utility or natural selection.

To this solid array of remarkable facts Mr. Wallace has nothing further to oppose than his customary appeal to the argument from ignorance, grounded on the usual assumption that no principle other than natural selection *can* be responsible for even the minutest changes of form or color. For my own part, I must confess

that I have never been so deeply impressed by the dominating influence of the *a priori* method as I was on reading Mr. Wallace's criticism of Mr. Gulick's paper, after having seen the material on which this paper is founded. To argue that every one of some twenty contiguous valleys in the area of the same small island must necessarily present such differences of environment that all the shells in each are differently modified thereby, while in no one out of the hundreds of cases of modification in minute respects of form and color can any human being suggest an adaptive reason therefor,—to argue thus is merely to affirm an intrinsically improbable dogma in the presence of a great and consistent array of opposing facts.

I have laid special stress on this particular case of the Sandwich Islands' mollusca, because the fifteen years of labor which Mr. Gulick has devoted to their exhaustive working out have yielded results more complete and suggestive than any which so far have been forthcoming with regard to the effects of isolation in divergent evolution. But, if space permitted, it would be easy to present abundance of additional facts from other sources, all bearing to the same conclusion,—namely, that as a matter of direct observation, no less than of general reasoning, any unprejudiced mind will concede to the principle of indiscriminate isolation an important share in the origination of organic types. For as indiscriminate isolation is thus seen sooner or later to become discriminate, and as we have already seen that discriminate isolation is a necessary condition to all or any modification, we can only conclude that isolation in both its kinds takes rank with heredity and variability as one of the three basal principles of organic evolution.

Having got thus far in the way of generalities, we must next observe sundry further matters of comparative detail.

1. In any case of indiscriminate isolation, or apogamy, the larger the bulk of the isolated section the more nearly must its average qualities resemble those of its parent stock; and, therefore, the less divergence of character will ensue in a given time from this cause alone. For instance, if one-fourth of a large species were to be separated from the other three-fourths (say, by sub-

sidence causing a discontinuity of area), it would continue the specific characters unchanged for an indefinitely long time, so far as the influence of such an indiscriminate isolation is concerned. But, on the other hand, if only half a dozen individuals were to be thus separated from the rest of their species, a comparatively short time would be needed for their descendants to undergo some varietal modification at the hands of apogamy. For, in this case, the chances would be infinitely against the average characters of the original half-dozen individuals exactly coinciding with those of all the rest of their species.

2. In any case of homogamy, however, it is immaterial what proportional number of individuals are isolated in the first instance. For the isolation is here discriminate, or effected by the initial difference of the average qualities themselves—a difference, therefore, which presupposes divergence as having already commenced, and equally bound to proceed whether the number of intergenerants be large or small.

It may here be remarked that, in his essay on the *Influence of Isolation*, Professor Weismann fails to distinguish between the two kinds of isolation. This essay deals only with one of the many different forms of isolation—the geographical—and is therefore throughout concerned with a consideration of diversity as arising from apogamy alone. But in dealing with this side of the matter Weismann anticipated both Gulick and myself in pointing out the law of inverse proportion, which I have stated in the preceding paragraph in what appears to me its strictly accurate form.

3. Segregate Breeding, or homogamy, which arises under any of the many forms of discriminate isolation, must always tend to be *cumulative*. For, again to quote Mr. Gulick, who has constituted this fact the most prominent as it is the most original feature of his essay, "In the first place, every new form of Segregation[1] that now appears depends on, and is superimposed upon, forms of Segregation that have been previously induced; for when Negative Segregation arises [i. e., isolation due to mutual sterility], and the va-

[1] This term may here be taken as equivalent to isolation.

rieties of a species become less and less fertile with one another, the complete infertility that has existed between them and some other species does not disappear, nor does the Positive Segregation cease [i. e., any other form of isolation previously existing]. . . . In the second place, whenever Segregation is directly produced by some quality of the organism, variations that possess the endowment in a superior degree will have a larger share in producing the segregated forms of the next generation, and accordingly the segregative endowment of the next generation will be greater than that of the present generation; and so with each successive generation the segregation will become increasingly complete." And to this it may be added, in the third place, that where the segregation (isolation) is due to the external conditions of life under which the organism is placed, or where it is due to natural selection simultaneously operating in divergent lines of evolution, the same remarks apply. Hence it follows that discriminate isolation is, in all its forms, cumulative.

4. The next point to be noted is, that the cumulative divergence of type thus induced can take place only in as many different lines as there are different *cases* of isolation. This is a point which Mr. Gulick has not expressly noticed; but it is one that ought to be clearly recognised. Seeing that isolation secures the breeding of similar forms by exclusion (immediate or eventual) of those which are dissimilar, and that only in as far as it does this can it be a factor in organic evolution, it follows that the resulting segregation, even though cumulative, can only lead to divergence of organic types in as many directions as there are cases of isolation. For any one group of intergenerants only *serial* transformation is possible, even though the transformation be cumulative through successive generations in the single line of change. But there is always a probability that during the course of such *serial transformation in time*, some other case of isolation may supervene, so as to divide the previously isolated group of intergenerants into two or more further isolated groups. Then, of course, opportunity will be furnished for *divergent transformation in space*—and this in as many different lines as there are now different homogamous groups.

That this must be so is further evident, if we reflect that the evolutionary power of isolation depends, not only on the *preventing* of intercrossing between the isolated portion of a species and the rest of that species, but also upon the *permitting* of intercrossing between all individuals of the isolated portion, whereby the peculiar average of qualities which they as a whole present may be allowed to assert itself in their progeny—or, if the isolation has been from the first discriminate, whereby the resulting homogamy may thus be allowed to assert itself. Hence any one case of either species of isolation, discriminate or indiscriminate, can only give rise to what Mr. Gulick has aptly called "monotypic evolution," or a chain-like series of types arising successively in time, as distinguished from what he has called "polytypic evolution," or an arborescent multiplication of types arising simultaneously in space.

For example, let us again take the geographical form of isolation. Where a single small intergenerant group of individuals is separated from the rest of its species—say, on an oceanic island—*monotypic* evolution may take place through a continuous and cumulative course of independent variation in a single line of change: all the *individuals* composing any one given generation will closely resemble one another, although the *type* may be progressively altering through a long series of generations. But if the original species had had two small colonies separated from itself (one on each of two different islands, so giving rise to two cases of isolation), then *polytypic* evolution would have ensued to the extent of there having been two different lines of evolution going on simultaneously (one upon each of the two islands concerned). Similarly, of course, if there had been three or four such colonies, there would have been three or four divergent lines of evolution, and so on.

5. In the *cases* of isolation just supposed there is only one *form* of isolation; and it is thus shown that under one form of isolation there may be as many lines of divergence as there are separate cases of such isolation. But now suppose that there are two or more forms of isolation—for instance, that on the same oceanic island the original colony has begun to segregate into secondary groups under the influence of natural selection, sexual selection,

physiological selection, or any of the other forms of isolation—then there will be as many lines of divergent evolution going on at the same time (and here on the same area) as there are forms of isolation affecting the oceanic colony. And this because each of the *forms* of isolation has given rise to a different *case* of isolation.

Now, inasmuch as different forms of isolation, when thus superadded one to another, constitute different cases of isolation, we may lay down the following general law as applying to all the forms of isolation,—namely, *The number of possible directions in which divergent evolution can occur, is never greater than, though it may be equal to, the number of cases of efficient isolation—or the number of efficiently separated groups of intergenerants.*

6. We have now to consider with some care the particular and highly important form of isolation that is presented by natural selection. For while this form of isolation resembles all the other forms of the discriminate kind in that it secures homogamy, there are two points in which it differs from all of them, and one point in which it differs from most of them.

Natural selection differs from *all* the other known forms of isolation (whether discriminate or indiscriminate) in that it has exclusive reference to *adaptations* on the one hand, and, on the other hand, necessitates not only the elimination, but the destruction of the excluded individuals. Again, natural selection differs from *most* of the other forms of isolation in that, unless assisted by some other form, it can never lead to polytypic, but only to monotypic evolution. The first two points of difference are here immaterial; but the last is one of the highest importance, as we shall immediately perceive.

In nearly all the other forms of isolation, polytypic or divergent evolution may arise under the influence of that form alone, or without the necessary co-operation of any other form. This we have already seen, for example, in regard to geographical isolation, under which there may be as many different lines of transmutation going on simultaneously as there are different cases of isolation,—say, in so many different oceanic islands. Again, in regard to physiological isolation the same remark obviously applies; for it is

evident that even upon the same geographical area there may be as many different lines of transmutation going on simultaneously as there are cases of this form of isolation. The bar of mutual sterility, whenever and wherever it occurs, must always render polytypic evolution possible. And so it is with almost all the other forms of isolation: that is to say, one *form* does not necessarily require the assistance of another *form* in order to create an additional *case* of isolation. But it is a peculiarity of natural selection, considered as a form of isolation, that it does necessarily require the assistance of some other form before it can give rise to an additional case of isolation; and therefore before it can give rise to any *divergence* of character in ramifying lines, as distinguished from *transformation* of characters in a single line. Or, in other words, natural selection, when acting alone, can never induce polytypic evolution, but only monotypic.

That this important conclusion is a necessary deduction from the theory of natural selection itself, a very few words will be enough to show. For, according to the theory, survival of the fittest is a form of isolation which acts through utility, by *destroying* all the individuals whom it fails to isolate. Hence it follows that survival of the fittest is a form of isolation which, if acting alone, cannot *possibly* effect divergent evolution. For, in the first place, there is nothing in this form of isolation to ensure that the fitter individuals should fail to interbreed with the less fit which are able to survive; and, in the second place, in all cases where the less fit are not sufficiently fit to be suffered to breed, they are exterminated —i. e., not permitted to form a distinct variety of their own. If it be said that survival of the fittest may develop simultaneously two or more lines of *useful* change, the answer is that it can only do this if each of the developing varieties is isolated from the others by some *additional form* of isolation; for, if not, there can be no commencement of utilitarian *divergence*, since whatever number of utilitarian changes may be in course of simultaneous development, they must in this case be all blended together in a single line of specific transmutation. Nay, even if specific divergence has actually been commenced by natural selection when associated with some other form

of homogamy, if the latter should afterwards be withdrawn, natural selection would then be unable to maintain even so much divergence of character as may already have been attained: free intercrossing between the two collateral, and no longer isolated branches, would ensure their eventual blending into a common stock. Therefore, I repeat, natural selection, when acting alone, can never induce polytypic evolution, but only monotypic.

Now I regret to say that here, for the first and only time throughout the whole course of my treatment of these subjects, I find myself in seeming opposition to the views of Darwin. For it was the decidedly expressed opinion of Darwin that natural selection *is* competent to effect polytypic, or divergent, evolution. Nevertheless, I believe that the opposition is to a large extent only apparent, or due merely to the fact that Darwin did not explicitly state certain considerations which throughout his discussion on "divergence of character" are seemingly implied. But, be this as it may, I have not even appeared to desert his leadership on a matter of such high importance without having duly considered the question in all its bearings, and to the utmost limit of my ability, Moreover, about two years after the publication of my first paper[1] upon the subject, Mr. Gulick followed, at somewhat greater length, in the same line of dissent. Like all the rest of his work, this is so severely logical in statement, as well as profoundly thought out in substance, that I do not see how it is possible for any one to read impartially what he has written, and then continue to hold that natural selection, if unassisted by any other form of isolation, can possibly effect divergence of character—or polytypic as distinguished from monotypic evolution.[2]

I may here quote from Mr. Gulick's paper three propositions, serving to state three large and general bodies of observable fact, which severally and collectively go to verify, with an overwhelming mass of evidence, the conclusion previously reached on grounds of general reasoning.

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[1] *Zool. Journal Lin. Soc.*, Vol. XIX. pp. 337–411.

[2] *Ibid.*, Vol. XX. pp. 202–211.

"The facts of geographical distribution seem to me to justify the following statements:

"1. A species exposed to different conditions in the different parts of the area over which it is distributed, is not represented by divergent forms when free interbreeding exists between the inhabitants of the different districts. In other words, Diversity of Natural Selection without Separation does not produce divergent evolution.

"2. We find many cases in which areas, corresponding in the character of the environment, but separated from each other by important barriers, are the homes of divergent forms of the same or allied species.

"3. In cases where the separation has been long continued, and the external conditions are the most diverse in points that involve diversity of adaptation, there we find the most decided divergences in the organic forms. That is, where Separation and Divergent Selection have long acted, the results are found to be the greatest.

"The 1st and 3rd of these propositions will probably be disputed by few, if by any. The proof of the 2nd is found wherever a set of closely allied organisms is so distributed over territory that each species and variety occupies its own narrow district, within which it is shut by barriers that restrain its distribution, while each species of the environing types is distributed over the whole territory. The distribution of terrestrial molluscs on the Sandwich Islands presents a great body of facts of this kind."

MAN AS A MEMBER OF SOCIETY.[1]

PART II.

UP TO THE PRESENT we have seen: (1) primitive man acquiring his first specific and distinctive characters; (2) the family at its origin among the savage tribes and the variations which it subsequently underwent; (3) the manner in which the first societies were constituted, and the principal forms which they afterwards assumed; (4) the two classes of evils with which they are affected, the one external in character—militarism—the other internal in its action—the antagonism of classes and individuals. Our purpose has been twofold: first, to describe human societies in their general characters as we described animal societies; and secondly, to show how the human species after issuing from the state of nature progressively attained the elevated social state in which we see it to-day; in other words, to follow its evolution, which was impossible in the case of animals. We have now to inquire what were the main and collateral influences that have been instrumental in retarding or accelerating the transformations of these societies and in bringing about their differentiations.

1. *The Influence of Races.*—If we look at the present distribution of the various groups of humanity which have been arrested at, or have retrograded to (a fact often difficult to establish), some given one of the stages which we have examined, the influence of the factor of race is incontestable. The black races of Africa and

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[1] Translated from Dr. Topinard's MS. by T. J. McCormack. Part I. appeared in *The Monist* for July, 1897.

of Oceanica, physically the ugliest, yet the most authentic and least crossed of all, are the lowest in civilisation. Most of them are still in the primordial fetishistic period; none of them have given birth to social organisations at all extended; some black hordes have indeed in times past created military monarchies, but their creations were ephemeral and have passed away without leaving any noticeable traces. No ruins or megalithic monuments exist among them giving the least evidence of prior relatively civilised states; the few ruins found in Southwestern Africa are derived undoubtedly from the reddish blacks or crossed Arabs who may be regarded as affined to the primitive Egyptian race. The Australoid race of Huxley, of which we really know but one authentic group, the Australians, are in the same predicament. They have created no institutions, have left no memorials. The characteristic of all the black races is their inaptitude to rise by their own efforts.

Passing to the yellow races, carefully excluding here the retrograded groups, like the Esquimaux and the Fuegians, we find them divided into groups which in favorable circumstances are rarely so low in type as the Botocudos, which sometimes attain an average level, like the Polynesians and generally speaking the Indians of the two Americas and the Dravidians of India, but just as often reach a relatively high level, like the Aztecs of Montezuma, the builders of the temples of Yucatan, the Peruvians of Manco-Capac, and, nearer to us in point of time, the Malays, the Chinese, the Indo-Chinese, and the Japanese. The characteristic of the yellow races is a certain quickness in apprehending the means of satisfying the immediate needs of life and of rendering existence agreeable; but they have little initiative, do not know how to raise themselves to higher planes, and are prone to immobilisation.

The white races remain. These are nowhere discovered in the low stages. They have already a relatively high civilisation in Europe during the prehistoric epochs—namely, during the Reindeer, Palafitte, and Hallstattian periods. They have had their phase of barbarism, like the Franks and the Germans, but one which was

already quite advanced. In the Orient and in Africa, since the first glimmerings of history, their civilisations were astonishingly high, and they had already commenced cultivating the sciences and letters. If I may be permitted to advance a rather bold and perhaps premature opinion, I should reduce the white races to four. The first, brown, small, and dolichocephalic, embraces the Mediterranean races of which I have already spoken; consequently the Greeks and Romans, the Berbers and Egyptians; and further, all the modern and ancient Semites of philology. The second, also brown, but of relatively high stature, embraces the conquerors of the Vedic epoch in India, the Persians, and certain others at which I cannot stop. The third comprehends the brachycephalic Celto-Slavs, concerning the relationship of which to some ancient Asiatic group, of which the Galtchas[1] are at present the nearest known representatives, I reserve for the present my opinion. The fourth is the dolichocephalic race, blond and of high stature, at present predominating in the Northern parts of Europe. Now, if we except the brachycephalic group, which although numerous and prolific played in prehistoric Europe only a subordinate rôle[2], we find it is these white races that founded all the great political states and all the great civilisations of Europe prior and subsequent to the Christian era. The characteristics of the white races are their marked aptitude for developing by their own independent efforts and for assimilating the empirical results of others, their ever increasing need of comfort, their vigorous and comprehensive cere-

[1] P. Topinard. "On the Celts and Galtchas." In *Bull. Soc. of Anthr. of Paris.* 1878, pp. 117, 247, 383, 391; and 1879, p. 220, etc.

[2] My opinion that the Celto-Slavic race is one of the primitive branches of the yellow races, and made its appearance in the Neolithic epoch, explains the subordinate rôle which it then and subsequently played. Sedentary by habit, following the movements of the populations with which it was in contact, but without notable personal initiative, willing to emigrate but readily returning home again, adaptable to all occupations, industrious, economical, sober and having few needs, it reminds us of the Chinese. The fact that in Europe, situated between the brown and blond races, who are so given to progress, it has remained stationary, like the Chinese, is deserving of remark. Examples of this race are, the Savoyards and the Auvergnats which I know best.

bral activity, and their spirit of initiative, which the expression "go ahead" of one of them so aptly expresses.

It cannot, therefore, be doubted for an instant that race has had a considerable influence upon the development of human societies. All races, in our opinion, if favored by circumstances, may progress, particularly when they are in contact with stronger races. But they have not all the same aptitude, and many which we have never known and which even anatomical anthropology cannot disclose, must have utterly vanished. There is a chance here of writing an exceedingly interesting chapter on the psychological characters of races from this point of view—characters which are just as trustworthy for distinguishing between them as are physical characters.

2. *The Influence of Language.*—At the beginning of this century, when comparative philology arose, an epoch of infatuation set in, which reached its maximum when Balbi in 1826, in an effort to moderate its pretensions, published his *Introduction à l'atlas ethnographique du globe.* Up to 1869, or thereabouts, and despite the brilliant discussion which took place in the Anthropological Society of Paris, writers invariably confounded peoples with races and languages with races. These times are gone by. We are today in the right path. We know that languages perish, decline, and are superseded in part or in whole, that their boundaries advance or recede without reference to race, as circumstances and frequently diplomatists determine. Philologically there are Aryans, but there are no Aryans by race. There is a French race from the point of view of language, there is none from the point of view of anthropology. But if language has no relation to race, it has to peoples or nationalities. A common language strengthens the bonds between the different fractions of the same people, encouraging the exchange of ideas and the conduct of business. It assists in the mixture, crossing, and fusion of races, as does everything that tends to bring individuals closer together, and in lessening misunderstandings and causes of conflict, just as the same religion, similar customs, and like interests do. Such is the great influence that languages have exercised on social development. Two indi-

viduals who understand each other are nearer to agreeing and fraternising, whether they are of different blood or not. There are, it is true, federations of states, both large and small, maintained between groups differing in language and religion, but then there are mitigating circumstances and superior advantages involved which offset the resulting drawbacks. Moreover, these unions are often only superficially such; the integrant states form national sub-individualities, rivalry between which is always to be feared. In short, unity of language between remote or adjacent groups of men proves but one thing, that at some period they have lived together during a long interval of time. Nations are the products of the events of history and of politics.[1]

3. *The Influence of Population.*—I can touch only briefly upon this factor, although it is the most powerful of all evolution. I have already shown how by rendering existence more and more difficult the increase of population forced man to pass from the hunter and fisher stages to the pastoral and agricultural stages, and from the latter to the commercial and industrial stages. I further indicated how it led to the antagonism of classes and individuals. The increase of population, it is true, is a complex phenomenon. According to the celebrated theory of Malthus, propounded in 1798, in every hundred years the alimentary resources of a country increase in arithmetical proportion only, whilst the population increases in geometrical. But the facts have contradicted him, the resources have increased proportionately more, there has been overproduction and resulting surplus, whilst the rhythm of natality has diminished, because the enlightened and far-sighted classes voluntarily limit the number of their children. If to this cause, which in the present civilisation seems to be on the increase, there be added the lessened disposition to have children evinced by women struggling for emancipation, the question arises, What will this ultimately lead to?

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[1] P. Topinard, *Le principe des nationalités; Revue critique à propos de la péninsule des Balkans*, in *La Revue d'Anthropologie*, p. 124, 1886. The same, *La race en anthropologie*, in the *Comptes rendus du congrès internationa. d'anthropologie et de préhistorique de 1892 à Moscou.*

4. *Influence of Topographical, Climatic, and Alimentary Conditions.*—Although man is a cosmopolitan animal who adapts himself to all conditions, the influence of the factors here in question is indisputable, though it has rather the effect of differentiating than of accelerating or retarding social evolution. It should certainly not be overlooked. Just as individuals vary and are more or less favored in the aptitudes they exhibit, so the countries of the globe present conditions of existence which are widely different for man. One country is naturally defended, as an island, a peninsula, or high valley; it will be protected by a desert or a chain of mountains. Another, on the contrary, will be exposed to all incursions. One country will be rich in fauna and flora, in mines of coal and metals, in rivers and seaports. Another will be arid, sandy, rainless, and exposed to all the winds of heaven, or swampy and unhealthy, too hot or too cold.

Necessarily the stimulants to action will vary in all these different cases as to number, power, and quality, and will give rise to widely different impulses. Progress as a rule is proportionate to the difficulties encountered, providing the latter do not exceed a certain limit and do not bring in their train discouragement and resignation; in some circumstances reaction is impossible. The more a country is the object of rival desires, the more are the probabilities of its giving rise to advanced forms of society. Such are the valleys of the Nile, of the Tigris, and of the Euphrates, of the Yellow and Blue Rivers in China, of the Indus and the Ganges. Western Europe has always been a bone of contention with the so-called barbarous nations, and has given rise to the highest civilisations. Conversely, the least envied countries, like the deserts of Sahara and Kalahari, the steppes of Central Asia and Siberia, lofty plateaus between two chains of rocky mountains, are the habitats of peoples who have advanced only slowly in civilisation. Generally speaking, the northern peoples, who are subjected to an invigorating atmosphere, are more active than southern peoples, who are enervated by heat and inclined to indolence, and yet it is among the latter that the Chaldean, Persian, and Assyrian empires, Carthage, Greece, and Rome arose. Mountains afford a refuge for

quiet, sedentary, and industrious peoples, and fertile plains for pastoral nations, etc.

5. *The Influence of Adjacency.*—This factor is considerable, although the works never dwell upon it. A society cannot be the same if its neighboring society is warlike and turbulent, or peaceable and sedentary; or if it is enlightened, religious, devoted to the arts, and possessing good laws, or ignorant, sceptical, uncultivated, and badly governed. Emulation and example are factors of the first order. We look about us and acquire the manners, customs, faults, and excellences of our neighbors, just as we acquire their language, religion, their methods in science and philosophy, their fashions in literature, and their ideas of morality. The imitation which M. Tarde has emphasised is more frequently a psychical contagion than a voluntary act. It is operative outwardly among nations as well as within them between different strata of society. The enticement of fashion may be observed in all fields of human conduct. Habits, like ideas, are communicated. Chiefs, legislatures, professions yield to imitation as much as individuals.

6. *Influence of Circumstances.*—By this word, which Lamarck used to designate the sum-total of all the causes capable of exercising an influence upon existence and of producing changes therein, we understand here simply such determinative facts as occur unlooked for, which in the normal course would not have come to pass, and which are the origin of a new impulse imparted to a society that has become immobilised or is involved in a different course of evolution—an impulse which may give rise to both good and bad results. The circumstance may be violent or feeble in character, or even insignificant. Of the first class and in the physical order, we have an example in the eruption of the sea, say the Zuyderzee, over a vast surface occupied by a peaceful people, who are thus forced to become warlike and to go in quest of another habitable country, where their habits are necessarily completely altered. Another example of the same class is an invasion of barbarians, who, after putting everything to the fire and the sword, draw off, leaving behind them a people who in one case never recovering from their exhaustion will retrograde, or, in the other,

shaking off their lethargy, will rise again and enter upon a career of prosperity which otherwise they would never have pursued. As to feeble, inconspicuous circumstances, who has not, at some time or other, observed their puissant efficacy? Events most frequently are the resultant of an *ensemble* of dispositions and circumstances. Ten or twenty will be combined. One of them, perhaps the least effective, will play the part of the drop of water that causes a vessel to overflow and so will be the determining cause. If the drop of water had not come at the right moment, the other conditions would have been dissipated and the event delayed or deferred forever. Circumstances, whether potent or feeble, belong to the domain of chance so-called, and are a factor with which we must reckon in evolution and the directions which it takes.

7. *Influence of Individuals.*—This factor is for man what the preceding one is for things. Let us suppose that in the circumstances presumed above where everything has united to produce a certain effect, the right man is not present; either the effect will not be forthcoming, or it will miscarry. Conversely, suppose the situation is not yet ripe, but that some one of that class of men who are called geniuses and whose interposition people regard as providential, arises; then the event can occur and bring in its train decisive transformations. Truly, men amount to little when they are not the expression of their time, when they do not come at their psychological hour. Many, and some of the most brilliant even, have thus passed away without their fellow-creatures having derived the least advantage from their existence. Such are the majority of military heroes whom history places in the first rank, who fill the world with their reverberant personalities and leave nothing behind them but smoke. But by the side of these ill-timed geniuses whose efforts have been bootless, how many there are whom history or tradition mentions, and others whom the world has forgotten, that at some time, by some little thing, some new instrument, some new process, some law, or simply some example, merit being inscribed among the prime causes that determine evolution. This species of men, these shapers of progress, seem to be almost entirely wanting among the black races; they are scarce among the yellow

races; they are common among the white races. The stages of evolution may be represented by a net, the threaded pathways of which are variously tied together. At the points of crossing are bright, salient knots; the latter are the individuals that mark the changes of the pathways. Whilst in animals progress is effected by circumstances taken in the broad sense of Lamarck, in man it is principally effected by individuals. The *élite* individuals are the wealth of a nation.

8. *The Influence of Needs, as Infinitely Differentiated and Multiplied in All Directions.*—This is the last and most important, though an indirect, factor. Lamarck made it the second link of his chain which leads to adaptation. Outward circumstances, he said, engender needs, the latter new habits, the latter excess or deficiency of use of organs, which last causes adaptation.

The doctrine of Lamarck, which is diametrically opposed to that of Weismann, having regained to-day the position which rightly belongs to it, particularly in the United States, where it has been ably defended among others by the late Professor Cope, we shall give a *résumé* of the mechanism of the needs which play so prominent a part in it. Let us take the following example. An animal is placed in a new environment where in order to live it must breathe harder. The quantity of air being insufficient, a painful sensation is produced in the lungs, which reverberates throughout the entire organism. This is the need, that is to say, a solicitation at once local and general, to breathe more energetically. The animal responds to it by powerfully contracting its respiratory muscles, the lungs dilate more than before, more air enters, the circulation is accelerated, the organism experience the consciousness of well being, it is satisfied. The same solicitation is repeated, the same response is made, the animal acquires the habit of the act, the habit being repeated from generation to generation is transmitted and fixed and becomes an instinct, that is to say, a simple reflex action in which the will no longer intervenes. In consequence, the respiratory muscles have increased in volume, the fibres that best conform to the respiration demanded are hypertrophied while those which do not so lend themselves are atrophied. The

pulmonary tissue, now more active, has augmented, its areoles have multiplied, its vascular and nervous webs have become enriched. The adaptation of the new condition has been accomplished.

In this case the initial solicitation came from without. In other cases it comes from within; for example, when new kinds of food are introduced into the mouth or stomach. The masticatory muscles, the teeth, perhaps the jaws and salivary glands, and even the stomach itself are forced to adapt themselves to the new function which is imposed upon them. But the following is a more general case. By the very fact that an organ is doing work, the blood is conveyed to it in increased abundance, enhances its sum-total of life, and so it becomes of itself a stimulus to further work, and consequently to improved adaptation to the special kind of work in hand. Let the stimulus which has engendered the activity be continued, and the activity thus excited will by virtue of the momentum acquired go on increasing, perfecting, and differentiating itself, according to the character of the operation and to the parts which have been its principal seat.

Such, more than any other organ, is the brain. Highly vascular, and in richly endowed individuals eminently subject to stimulating impressions, it carries within it the principle of its own activity, its own improvement, and its own differentiation according to the character of the faculties which the individual sets in play, according to the impressions which he receives, the impressions which he accumulates, and the ideas which he elaborates. Few individuals are free to withdraw from its influence, or not to respond in the presence of excitations which have come from without or of incitations which have come from within. There are, it is true, races and groups of men who in all circumstances evince more or less *sang froid*, if I may be permitted the expression; individuals without resiliency and of apathetic temperament, acting only from habit and giving play to their general reflexes in which the will enters only from compulsion, as in walking and in certain spontaneous acts which are performed without reflexion. In such persons, cerebral action may become immobilised, may fall off, and

even retrograde. But at their side are those who possess in abundant measure that which is the characteristic of man, namely, a powerful cerebral activity, who are sensitive, lively, and militant. The latter are alert to impressions, direct their attention to wherever it is solicited, think, and never leave their brain at rest. In the latter, the potency of the cerebral organ increases, intellectual needs are multiplied and engender progress, both to the profit of the individuals themselves and to that of the society of which they are part.

This remarkable property of the brain, which in some measure is characteristic of all organs, of bearing within itself the stimulus to its own activity, is only a particular application of the broad and general biological law that every function, be it organic, sensory, or intellectual, tends to increase, if left to itself; or that action engenders action, sentiments sentiments, secretions secretions, hypergenesis hypergenesis, and, generally, that everything which has life has the need of living more, of living to the full. This is the sum and substance of that law of proliferation and of expansion which we cited as the first biological factor of evolution, on page 26 of *The Monist*, for 1895.

Needs in animals as in man are of two kinds: physical or organic, and psychic or intellectual; the latter attaining in man a development unknown in animals. Physical needs have reference to the conservation of the species or to the conservation of individuals. Breathing, eating, shelter from the elements, covering oneself with mud or dust as a protection against insects, running from the sheer love of exercising the muscles, are examples of these needs. Associating with one's fellows for amusement and mutual happiness, the desire to dominate, to protect, sometimes to sacrifice oneself for them, the wish to be approved of and admired, and the longing to excel in the chase or in racing, are examples of the psychical order.

Needs and their consequences embrace the same elements in man and in animals: solicitation to an act and the desire to respond to it, the pleasure experienced, of which the memory is preserved, which alone forms an inducement to repeat the act, and

satiety. In the animal, the surplus or deficiency of satisfaction obtained may bring about a differentiation of needs. The animal will feel, according to circumstances, the need of this or that kind of food, of this or that shelter, of this or that pleasure; he will be induced in various ways to satisfy his vanity and his need of society. In man, in whom the psychical element strengthens the organic need, and who discriminates between sensations and so arrives at the most varied distinctions, the physical needs are rapidly differentiated.

Thus, at the beginning man rent and devoured his prey raw. Chance attempts demonstrated to him that cooked flesh gave more satisfaction. He began over again, acquired a new habit, and thenceforth the use of cooked meat became a need, which assumed various forms and led later to the invention of the art of cooking. At the beginning he ate with his fingers and drank directly from the brook. One day he invented utensils and pottery. Eating and drinking from vessels became a necessity. Later a table was wanting, and a seat for making himself more comfortable at his repasts. Then he longed for decorated vessels and all sorts of superfluities, —all habits empirically aquired and ultimately becoming needs which he had to satisfy. So also at first he went about naked. He began by using leaves, then skins, and finally sumptuous garments. And so it is in all things.

But with the multiplicity of needs or of demands life became more complex and more difficult. It became necessary to work more and to seek other resources. Three hours a day were sufficient to satisfy the original needs of man; ten, it may be, are necessary at present. Hunting was followed by barter, the raising of cattle, agriculture, and industry. In those days one constructed one's own dwelling. It is now necessary to run to the carpenter, the glazier, and the locksmith. To the struggle for life has been added the struggle for appearance,—the desire of possessing a more beautiful residence, larger grounds, distinguished social position, and political power,—all desires which men cannot resist, which form the greatest stimulants to individual activity, and which

constitute the agents of progress. This leads us to psychical needs.

9. *Psychical Needs.*—It goes without saying that in the preceding instances the brain is not indifferent, although it plays only a secondary rôle, being prompted thereto by external excitations. In psychical needs the case is different; here the action of the brain is primitive; the point of departure, the work and pleasure involved, are inherent in the cerebral organ itself, and are independent of the acts which may fortuitously result therefrom. These needs are of two kinds: (1) *sensitive* or *emotional*, that is to say, connected with the sensibility proper of the brain, with that sixth interior sense which gives us cognisance of what is going forward in the cerebral organ and which constitutes the sensorium; and (2) intellectual, that is to say, connected with the internal work which is going on, with the exercise itself of the faculties. Examples of the first kind are the need of belief, of worship and prayer, the need of loving and of being loved, the need of approbation and of admiration, whence the need of engaging in combat and of gaining glory, of leaving behind oneself a name. But these last are already of a mixed character closely related to the needs of the preceding paragraph. Examples of the second kind are the needs of knowledge, research, discovery, explanation, the need of inventing, of creating, of imagining, of setting oneself an ideal. They are in general more highly developed according as the action of the brain is more predominant, be it in the evolutionary scale of the human groups themselves or in the scale of individual variations within the same group. Here we may seek with most reason the characteristics of what Isodore Geoffroy St. Hilaire has called the human kingdom, and the personal dominant note of each individual.

Nevertheless, we find the germs of these needs here and there in animals. The dog, for example, who, motionless and intent, lovingly regards his master and worships him as a divinity and, when that master slays him, dies with tears in his eyes, is obeying a psychical need and finds its sole recompense in himself. In the same way, the bird or mammal who soars or runs with his fellows

of the same sex, shares their existence, and abandons himself to the joy of the occasion, is moved by none other than a cerebral need which purely internal pleasure consecrates. The ass or the horse who makes himself the chief of a troop for tyrannising over or protecting those feebler than himself, has also no other motive than a cerebral need. The fighting cock matched in a pit against another whom he has no reason for combating, and where there is even no female at stake, is not moved by considerations of advantage; his nervous centres simply command him, he obeys, his reward is the glory he wins—a psychical sentiment. The monkey, finally, who turns a screw to and fro in order to find out how it enters a hole, or twists a key in a lock in order to open a door, is not concerned about the advantage which he may derive therefrom; to have succeeded in finding out what he wants is his whole joy.

We cannot stop at all the complex types which psychical needs exhibit in man. We shall abide by those which best lead to the object which we have set ourselves, *videlicet*, to the active types which on the one hand have created the sciences, and on the other the arts, letters and philosophy, and to the passive type which has engendered sociability.

Taking as our criterion the way people have of looking at the world there are two kinds of cerebral organisation. External objects at rest or in motion are made known to us by our senses, which furnish us with images comparable to instantaneous photographs. These are centralised by the sensorium and stored up in its library. They are the materials upon which the intellectual faculties then exert their activity and from which they draw generalisations and relations, that is to say, ideas of the first, second, third, fourth, or fifth order, some having resemblance to the original images proper, others being more and more remote from the latter and still others being veritable creations, often having no palpable bonds with the ideas from which they sprang. Now certain minds can never lose from sight the photographic images of resting or moving objects, which images are the equivalents of the things of nature; they never omit comparing them with one another, always take account of the additions and modifications which

their individual sensibility imparts to them, and appraise and judge their reciprocal relations as if they were spectators observing them from above. They are the objective type. Others, on the other hand, suffer themselves to be carried away by their sensibility, by the labor to which they subject these images, and by their imagination. They confound with the objective images the new images which they have conceived and the ideals which they have deduced from them ; they replace them by intuitions ; they even go so far as to say that these images are the appearances and that the conceptions are the sole realities. They are the subjective type. The first have given rise to the sciences, the second to the arts and letters, and to philosophy,—the two opposed poles of human thought.

10. *The Sciences.*—These are the outcome of the need of knowing and of explaining, restricted by certain requirements of method, of which the following are the principal: to consider things objectively only; to begin with simple things; to hold steadfastly to the aim of one's research without anticipating the solution of the problem; to proceed from the known to the unknown; to stop when the facts forsake us, and then take refuge in agnosticism; not to forget the precept *qui va piano va sano;* to begin the edifice at the base. The first thing is to observe the phenomenon or object in the rough; the first operation consists in comparing it with a sufficient number of other phenomena or analogous objects, and to establish their differences or resemblances. The first result is one or several relations obtained by induction. Classification, more and more general views, analysis and experiment as means of control, and statistics, are the more advanced procedures. The end is the knowledge of the real world.

For a long time man was an observer only. He was led by empiricism, and not by methodical reasoning, to the moulding and baking of his first earthenware, to the mingling of tin and copper to form bronze, to the employing of bows and arrows, boomerangs, levers, wedges, rollers, etc. The first science that rises above the horizon of our knowledge is astronomy, which already presupposed considerable mental development. The honor of having cultivated it belongs to the Chaldean and Egyptian priests, and perhaps also

to the Chinese. Although counting does not make an early appearance among savages, yet the science of numbers followed; being unquestionably derived from the preceding. Then medicine succeeded with Hippocrates, a good observer but a weak theorist, natural history with Aristotle, who, in his *History of Animals*, advanced this science to a high pitch, human anatomy with Erasistratus and Herophilus, and physics with Archimedes. The start had been made. But with Christianity and the invasion of the barbarians, abysmal night set in. Faith, which is not favorable to the search for truth, diverted men's minds in other directions. In the sixteenth century, the sun arose again. The sciences resumed their career, began a majestic development, and have now reached the lofty altitude of the nineteenth century, crowned by its Darwins, Pasteurs, and Edisons, the preludes of new conquests, of which the limits cannot be foreseen.

11. *Arts and Letters.*—The second kind of cerebral activity, which bears within itself its own stimulants and its own reward, has, in a far broader sense than the former, its roots in the animal world, where it is manifested by the distinguishing of certain sensations that have already attained a considerable degree of delicacy. The birds listen morning and evening to one another's songs, respond, and render genuine concerts. Serpents may be charmed by the flute, the horse is roused by the sound of the trumpet, all have heard of the dog who, whenever its mistress played on the piano, ran to her door and listened long and absorbedly. Monkeys strike the trees in rhythmical cadence with their sticks. It is certain that some animals are moved by a bright and joyous morning, by a glorious sunrise when nature is in holiday attire, and it is not impossible that these moods have given rise in man to the sense of the beautiful.

In man the artistic sense is a complex and composite formation, in which the following factors enter: (1) the pleasure afforded by the senses, especially by sight and hearing, which leaves behind it a distinct and lively impression; (2) a quite peculiar subtlety of certain aspects of the sixth or internal sense, rising to what has been denominated the æsthetic sense; (3) the faculty of invention

or creation, augmented in certain directions by a more or less lively imagination; (4) the need, frequently but not always expressed, of reproducing the works which one has conceived or the ideal which one seeks to approach, in music, painting, sculpture, speech, or writing.

As far back as our archæological knowledge permits us to go, and as deep down as we descend in the scale of existing savages, we discover some taste for artistic things. We have the drawings of the Troglodytes of the Vézère, of the Esquimaux and the Australians. We have seen with our own eyes a Bushman girl of fifteen or thereabouts drawing designs which were remarkably accurate. Songs and dances accompanied by music are a pleasure which the savages of all countries affect. When the Esquimaux have a quarrel to settle they challenge each other to a duel in which each struggles to outdo the other in song and poetry. The literary collections of the redskins are being daily enriched.

If we pass on from this point to the first civilisations of history or of proto-history, architecture, decorative art, and even literature appear in Assyria and Egypt at a stage of development which is remarkable. Towards the year 1000 B. C., at the dawn of Grecian civilisation, the poems of Hesiod and Homer appeared. And in the age of Pericles we have an architecture, a decorative art, and a sculptor Phidias, that have never yet been surpassed.

All this justifies us, without going further, in concluding that the various factors which give birth to arts and letters, attained in man a high development far earlier than those which gave rise to science.

12. *Philosophy.*—The third species of cerebral activity, that has sprung from the inherent need of this organ to labor and finds in itself the sole reward of its labor, is philosophy. Its place would be between the two preceding. Like the first, it answers to the need of knowing and explaining; like the second, it proceeds from subjective sensibility, from the faculty of inventing, of creating, of imagining, and views its conceptions as absolute realities. Let us follow its development. Animals, as we have seen, in the presence of phenomena which they do not understand, retire confounded.

Savage man does the same. But he at least hazards the attempt of an explanation by investing the objects or phenomena in question with life and sentiments similar to his own. Later, this same savage, discovering or believing to discover in himself a double being, the one corporeal and the other spiritual, transfers the new notions regarding himself to objects without himself, to stones, plants, animals, or stars. This is the second period—animism. Here the savage is simply superstitious. Of these objects, or of their doubles, the spirits, he makes fetishes. To worship the products of imagination is superstition. Religions, at first more or less elementary, with their founders and priests, do not appear until later.

For a long time the sorcerer, that is to say, a man less credulous than the rest, and adroit in the sense of knowing how to reap personal advantage from the beliefs of his fellows, stood alone in his clan. Sorcerer and medicine man at once, he distributed amulets, drove out spirits from the bodies of the deceased, and caused the rains to fall. Consulted in the councils and on the departure of expeditions, he added to his prophetic functions of foretelling events, the performance of sacrifices designed to conjure evil spirits. With the increase of population, the number of sorcerers increased. The different sorcerers were led to combine, to act in concert, to consolidate their interests, and to regulate their rights and beliefs, which were the foundations of their power. Thus the sacerdotal caste arose, at times recruiting itself from the outside and at times hereditary. More intelligent than the others, more disposed to reflect, the priests were naturally inclined to seek more satisfactory explanations for the phenomena of nature, to distinguish general causes from particular causes, to reduce the number of the spirits, to champion the most important of these, and even to symbolise many of them. The cult of heroes, of personages in the tribe who had rendered it valuable services, and of ancestors, was mingled with the preceding beliefs. Having to speak to simple people, for whom it was necessary to materialise things, they were obliged to recast their ideas and to expound them by the help of fables and myths, which soon essayed to explain in a tangible form the origin of things, the existing phenomena of nature, and

often to guide the conduct of men. These were the first attempts of philosophy, already as utilitarian as they were mystical.

Animism was for a long time nothing but crude naturalism, intentionally fostered perhaps in the popular classes. Following the method of survivals, we have found it existing everywhere more or less. It was general in India at the time of the Vedas, throughout all ancient Egypt, and in China before Confucius. It frequently competed with the family cult of ancestors which existed by its side. Gradually, however, the number of the spirits diminished; some which possessed more general significance displaced the others. Such were the genii of light and darkness, the genii of good and evil, who were opposed in combat; and also the genii of the heavens, the sea, Hades, war, and the harvest, known among the Greeks by the name of Jupiter, Neptune, Pluto, Mars, and Ceres. There were thus constituted hierarchies of divinities, Olympi of gods and demi-gods, the anthropomorphic adventures of which have been recounted and embellished by the poets. This was the phase of refined polytheism, naturalistic at its base, sometimes symbolical in its culminations, part for the people and part for the initiated.

Religions consecrated a multitude of usages and ceremonies from which the sacerdotal class lived and which greatly augmented its power; but they also exerted a strong political influence. At times they lodged the entire governmental power in the priests; it is known that the Egyptian monarchy began some five thousand years before our era by Menes having overthrown the sacerdotal domination in Egypt and subsequently having established himself at Memphis. Sometimes they founded a collateral monarchic or oligarchic power, and suffered the laws to be promulgated as ordinances or revelations of the Gods. At other times they amalgamated scattered tribes and made of them a nationality. Again, they led up to genuine moral codes such as those of Brahma and Buddha in India, and Confucius in China..

The philosophical idea and the utilitarian idea were associated in the last instance. In China, without ever a word of God or of the immortal soul, it was held that the law of heaven was perfec-

tion and the law of earth the perfectioning of self; that duty is an internal obligation to which every one should bow, the object of which is fraternity and the basis the family organisation, fostered by the worship of ancestors, of which we have already spoken.[1]

Subsequently to the Vedas in India the two ideas led to a naturalistic pantheism and to a system of morality which was derived therefrom as follows. The trinity at the summit of the edifice comprised three principles: The first, the creator, or Brahma; the second, the destroyer, or Siva; the third, the conserver, or Vishnu. The immortal souls passed, for a cycle of years more or less prolonged, from one body to another, higher or lower in the natural scale, according to the conduct of the individual. The end and the final recompense of those who have attained by their conduct the last stage of wisdom or of good is the extinction of all evil by submersion in the great All. When one of these Brahman preachers was asked what the Supreme God was, he replied, Of what use is it to cudgel one's brains about a thing one can never know. It remains to be known whether this doctrine led the Hindus to the conduct which yields the greatest amount of happiness.

The utilitarian idea appears to have dominated among the Phœnician and Canaanite peoples. It gave rise to the doctrine of a personal national god who had created man and the people whom he had chosen and whose destinies he directed. With them he had made a covenant. He exacted from them blind and exclusive worship and obedience to the laws which he promulgated. In return he protected them, reserving the right of terrestrial punishment. Pantheism and the immortality of the soul are, according to M. Fouillée, the general tendency of the Aryan peoples as monotheism without the immortality of the soul is the characteristic of the Occidental Semitic peoples. Both seek the sanction of moral conduct in a power beyond the individual, whilst the Chinese place it in the

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[1] It may be that the official religion of China is the apparent religion only, and that family religion is the real motive power, that has the most influence upon conduct. This is a question that is still to be looked into. See, among others, J. I. Lanessan, *La Morale des philosophes Chinois. Extraits des livres classiques de la Chine et de l'Annam.—Bibl. Scientif. Contemp.* Paris, 1896.

individual himself. The Egyptians are related to the Hindus by their belief in metempsychosis or in the transmigration of souls from animal to animal, but they have set a limit to the transmigration. The cycle has been fixed at three thousand years. A posthumous judgment is then pronounced by forty-two judges over whom Osiris presides. This conception of a single judgment after death, if not of a second, when the cycle has run out, passed through these peoples to the polytheism of Greece and Rome.

In Greece it was among the philosophers or thinkers by profession and not among the priests, that the fetishistic idea and then the generalised animistic idea (subsequently simplified and sometimes symbolised) reached its highest and most spiritual form. It became here the idea of unity pervading the All, but of a unity which was ineffable and undemonstrable, which was conceived as universal and eternal, and for which the name of God was reserved. This is idealistic pantheism.

Greek philosophy is the most striking known expression of the cerebral need above mentioned, which impels man to exercise his intellectual faculties from the sheer pleasure of the exercise. It is the most astonishing proof of the progress accomplished by reason since its modest origin in primitive man. It is proof of the unlimited confidence which man subsequently placed in himself and of the immeasurable sweep which his faculty of imagination took. Without any other empirical basis than the common observations which every one makes, Greek philosophy rose audaciously to the loftiest and boldest conceptions, not conceptions crowning an intellectual edifice, but conceptions which dominate it in imaginary realms of space. Its fundamental idea was this: nature is admirably co-ordinated in all its parts, things are bound together by a necessary connexion and have both efficient and final causes. Through mathematics the only science then advanced, that with which all minds were infatuated, they conceived and demonstrated the harmony of forms. By reason man similarly conceives and comprehends the order which reigns in all things.

At the beginning, Greek philosophy sought the principle of the world in water, air, and fire, then in motion, atoms, numbers, at-

tractions, and repulsions, and finally, in a divine and universal unity.[1]

For Plato, the things which the senses show us are appearances only, shadows (the relative). The true light is that of reason, the only realities (the absolute) are what reason conceives. Individuals die, their sensations are extinguished with them. That which reason has revealed is the truth that persists and is eternal. Ideas take precedence over sensations. God is the highest idea, the last, the supreme idea, the quintessence of the correct, the good, and the beautiful. Next comes reason which has conceived him—intelligence. Finally comes the third general idea, the world, the universal soul from which all particular souls emanate. The nature of man is two-fold. One is the spiritual, that is, the immortal part, the soul; the other is the corporeal part. The first commands the second and should make every effort to approach nearer to the universal soul of which it is an emanation and consequently to God, the supreme idea, the sovereign good. The virtuous man, the sage, is he whose conduct conforms to these principles. He is a destiny to himself. As a sanction, Plato admits the posthumous judgment of the soul in the manner of the Egyptians and of Greek polytheism as also the cycle (*Republic*).

Aristotle belongs apart. He is at once scholar and philosopher, he observes nature. He is the founder of natural history, of anthropology, of political science, and of political economy. According to Graef he is also the founder of positive philosophy because he was the first to introduce positive facts into philosophy. In writing his *Politics* he is said to have gathered for the purpose one hundred and fifty different constitutions. In many points he is in accord with Plato, but not in all. For him the attributes of bodies cannot be separated from these bodies. Abstract general ideas are nothing but words and names. The universal good, the universal absolute, do not exist; the individual soul is not immortal for without memory all personal consciousness is impossible;

[1] Paul Janet. *Histoire de la Philosophie, les problèmes et les écoles.* Paris, 1894.

every thing, every plant, every animal has its end—amelioration in the sense of its relative welfare. The goal of man is self-perfection with a view to happiness. Nature herself impels him to this end. Virtue is the appropriation of acts to this end. There are three kinds of virtues: animal, moral, and intellectual. Moral virtues consist in preserving a just mean. They are habits which have sprung from the repetition of acts by education.[1]

But by the side of the theorist in these two philosophers we have also the practical man, who knows how to change his point of view and to place himself on a level with his times. By the side of the above-mentioned transcendental works we have plans for social organisation expounded by Plato in his *Republic* and his *Laws* and by Aristotle in his *Politics* and *Morals*. The ideas which here reign supreme are the omnipotence of the State, public utility, and the natural inequality of man. At this epoch in Athens the mass of the population, as we have said, were slaves. A large number were aliens who had taken up their domicile there; a small body only, 9/100, were citizens, distributed into higher classes (priests, magistrates, and warriors) and into certain lower classes. Now the views of Plato and Aristotle had reference only to the citizens of the higher classes. Aristotle in his *Politics* says that the true citizens are only those who are neither farmers nor tradesmen, nor handicraftsmen,[2] and that some people were born to command, others to obey. The following is the general rule of society for Plato: each person should strengthen himself in his prerogatives, his rank, his profession, and not mingle in affairs which do not concern him. In the warrior class he demanded community of women and children and *selection* by the magistrates of the best producers, as in the case of selection for cattle, so as to obtain as subjects the strongest and most beautiful, that is to say, those who would be most useful to the State.[3] The public welfare is the first social

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[1] *The Nicomachean Ethics of Aristotle.* Transl. by Peters. London, 1895. *La morale à Nicomaque d'Aristote.* Trad. par L. Cassan. Paris, 1886.

[2] *Aristote. La Politique.* Trad. de Thurot. Lib. IV. Ch. VIII. Art. 3. Paris.

[3] *Platon. L'Etat ou le Republique.* Trad. de Bastien. Lib. V. Ch. II. Art. 1 et 2. Paris.

principle, the only one indeed; the independence of individuals is subordinate to it. For Plato, as for Aristotle, the education that makes men is one of the first functions of the State. Both sacrifice the individual to the family and also to property.

Other Greek philosophers also busied themselves with practical morals. Socrates, contends Boutroux, is the real founder of the science of morals. Prior to him the sophists had in all laws distinguished the elements derived from nature and those derived from custom. Socrates distinguished unwritten laws which were universally admitted and had been instituted by the gods, and written or human laws. Happiness, utility, and good were one. The interest of each one conforms to the public weal. Socrates defends woman and the slave.

For the Stoics morals is the art of living. We must contemn the physical needs which do not depend on us and esteem only the moral needs of which we are masters. Happiness is within us in the exercise of our faculties, and for what does not concern us, in indifference. For the Epicureans, to follow nature and to seek pleasures, preferentially those of the mind, is the best rule. The doctrine of the first, although tinged with pride is a beautiful one, but like that of the second, led its later disciples at Rome to the extinction of all individual energy and to the consecration of egoism.

In sum, the Greek philosophers founded the intuitive method, the yoke of which philosophy has never yet been able to throw off. They opened up, in various directions, some spiritualistic and others materialistic, the paths which we are still following. They were the first consciously to attack the problems of human conduct, both individual and social; and yet in the general run they were dialecticians, sophists, and intellectual gymnasts only. But such as they were, they founded free inquiry, disintegrated the national polytheistic beliefs, and prepared the way for the revolution which was on the verge of accomplishment.

Society, which soon was epitomised in the Roman world, was just attaining in fact one of those critical phases in the history of evolution where all the circumstances coincide that are calculated to bring on transformations and provoke new adaptations. The

evils which militarism had engendered had reached their acme, morals had been perverted to the last degree, scepticism was universal and the disorganisation was complete.

It was then that in an unknown corner of Judea on the banks of a lake the glad tidings burst forth of a coming regeneration, and a voice was heard pleading the cause of the feeble, the humble and the oppressed, and saying: "Love ye one another." The doctrine, at first local and inculcated by a small number of apostles, soon extended with St. Paul to the Gentiles, and thenceforward its progress was rapid. Philosophy was not indifferent to it. Plotinus of Alexandria, who has been named the Jewish Plato, and also the father of the fathers of the Church, desiring to reconcile the Greek philosophy with the new ideas, distinguished in God three things: the Father, the Mediating Word, and the Holy Ghost. A little later Philo, the chief of the Alexandrian school, conceived the same Trinity as follows: the Good, the Intelligence, the Soul, three degrees of the same God, one derived from the other and consequently unequal—the Trinity which Christianity adopted at the Council of Nice, but modified, despite the efforts of Arius, as follows: the Father, Creator *ex nihilo* by a bare act of his will, the Son, and the Holy Ghost, all three of equal degree and forming but one single God in three persons. The creation *ex nihilo* was a step backwards.

Christianity, in effect, instead of conquering the pagan world, was conquered by it, as Huxley has remarked. The fathers of the Church were overreached, the councils gave way before manifold influences, concessions were made to the barbarians, the primitive spirit swerved from its initial path. The Church, centralised in one of its patriarchs, became by degrees a terrestrial power having its needs, its ambitions, and its army of monks. It pretended to universal monarchy, had its political struggles, and ended in a despotic tyranny which lasted for ages until the schism of Luther—a breach made in behalf of the right to examine the holy Scriptures, and of which one of the ethnical effects was to separate the Northern blond races from the Southern, Celtic, and brown races.

During the Middle Ages science had disappeared from the

West. Philosophy, hemmed in between metaphysics and theology, became scholasticism, which sought to reconcile Plato, Plotinus, and Aristotle with the needs of orthodoxy, and split hairs over subtle essences and entities. In the first phase, faith and reason were confounded: "*credo ut intelligam*," said St. Anselm. In the second, reason was placed in the service of faith. In the third, the nominalists denied all harmony between the two. All this culminated in lassitude and scepticism. In was then that a concourse of circumstances occurred which, as fifteen centuries before, was to transform the Western world, although differently, and which inaugurated modern times, to-wit: the return to the West of the knowledge that had taken refuge among the Arabs, the discovery of printing, which spread everywhere trustworthy texts; the discovery of the new world which quadrupled the surface of the earth to be observed and studied; the awakening of science with Copernicus, Galileo, Kepler, Rondelet, Vesalius, Harvey,[1] and finally, the Reformation.

On the downfall of scholasticism, the first care of philosophy was not the renouncing of what had been its essence, the search for the absolute by intuition and reason, but the overhauling of its methods which it sought to render more precise. On the one hand, Descartes, the orthodox representative, defended the sovereignty of reason and the mathematical method by postulates, successive unbroken deductions, hypotheses, and intuition. On the other hand, Francis Bacon, who was inspired by Aristotle, contended that the book of nature was the true tome to be deciphered and commented upon; that "for the futile reasonings of dialectics, observation and experience were to be substituted; for deduction, which drew consequences, induction which established principles;" and that observation is particularly necessary for the facts which we inwardly observe in ourselves,

The subsequent divergencies were founded less in the varying intellectual and logical make-up of each philosopher and in their

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[1] P. Topinard. *Eléments d'anthropologie générale.* Chap. I., Paris, 1885. Edit.: Vigot frères.

method of applying their faculties than in their individual ways of feeling and conceiving. Philosophy in effect is simply a struggle between these elements. One is materialistic or idealistic, rationalistic or empirical, sees one's ideal in liberty, altruism, necessity, or something absolute, according to one's temperament. We have given endowments, variable endowments,[1] partly congenital, and partly acquired by the first impressions and the first readings of youth.[2]

Nevertheless, the conquests of science began to make themselves felt. The field of philosophy was narrowed; there was now less insistence on God and more on the world, man, morals, and the conditions of social life. The overhanging metaphysical cloud is more or less heavy, it sometimes nears the earth, and at spots suffers the light to pass through. There are two streams: the one, continues Descartes, in France with Pascal, Bossuet, Fénélon, and Malebranche, in Germany with Spinoza and Leibnitz; the other, in England, represented by Bacon, Hobbes, and Locke.[3] It is strange, but philosophers who are diametrically opposed to each other, who have started from different points and have conducted their reasonings differently, arrive when the figurative obscurities of their language are removed, at similar results—results which the freethinkers of to-day would not disavow.

Take Spinoza. He is a pantheist and proclaims the unity of substance and of perfect infinite being. Man is endowed with two natures, two different modes of this substance, the one spiritual, the other corporeal, in perfect pre-established harmony. Free will does not exist *a priori*, for everything is derived from the essence of God with absolute necessity; nor *a posteriori*, because our feeling of freedom is reducible to that of ignorance of the causes which determine us. Nature has no end and strives towards no goal; it

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[1] M. Topinard says: "On a telle ou telle grâce, une grâce variable," etc.—*Tr.*

[2] Leibnitz narrates that when scarcely fifteen years old he was debating whether he should champion Aristotle or Democritus.

[3] Alfred Fouillée. *Histoire de la Philosophie*. Paris, 1893. The same, *Extraits des Philosophes*. Paris, 1897. We have borrowed much from these two works, although not sharing all the views of their author.

is what it is, because it cannot be otherwise. Good and evil are merely ways of thinking; the useful is what affords us pleasure; morals are merely the science of utility, the science of happiness. To comprehend utility is all of the moral law and that which brings us near to God.

Another example is that of Kant, who in Germany marks the end of the eighteenth century. For him, God, the immortal soul, and personal liberty are moral necessities which we must admit if duty is to be justified. "The starry heaven above us, the moral law within us, are the only two things that call forth my admiration and respect," he writes. The only thing absolutely and immediately certain is duty. There are two sorts of commandments or imperatives, the one conditional and proceeding mainly from necessity, the other categorical, which is duty itself. To believe in liberty, without which the "ought" is impossible, is the first of all duties. There are in us two egos; one absolute, eternal, and unrelated to space and time; and the other sensuous, connected with our individuality and subject to determinism. The first is free, the second is not. Nature, such as science knows it, does not appear ruled by the moral law, but by laws which apparently are quite different from it. Ethics implies three postulates: (1) the possibility of harmony between morality and happiness, or the sovereign good; (2) the immortality of the soul; (3) the assumption that the sovereign good is the supreme end to which the universe tends and which the universe will reach. In brief, Kant reversed "the old metaphysics which was called the science of being or ontology and which thought itself the science of the absolute (Fouillée)," but he put in its place another which I shall call utilitarian metaphysics.

The other movement, in England, is particularly interesting for us. With Bacon, at the dawn of the revolution in that country,[1] it entered again on the path which had been opened twenty centuries previously by Socrates and Aristotle.

The end which laws should strive for, says Bacon, is simply

[1] The Novum Organum appeared in 1620. Charles I. ascended the throne in 1625.

that of rendering the citizens of a state happy. Private Right exists by the side of public Right; the study and the practice of law should be freed from pure empiricism as well as from all metaphysics.

Hobbes continues this thought. In practice as in theory, he says, necessity is our sole rule. Our sentiments are egoism transformed. To seek pleasure and avoid pain is the law of nature. The state of nature is war, the strongest wins: *homo homini lupus*. To put an end to this state, man forms societies, he renounces his individual rights, absolute over all things, on condition that others do likewise. This exchange of renunciations is a contract, that is to say, a reciprocal obligation equally binding upon all. But here Hobbes reaches a singular conclusion. In order to assure the execution of this contract, he proposes to lodge its absolute enforcement in the hands of a monarch who has unreserved power to take to task any one who seeks to avoid the compact but who is himself obligated in no wise. The contract of Hobbes is an abdication. The sovereign which Hobbes had in mind in his own time and in his own country was his friend Charles II.

Locke, fifty years after, resumed these ideas. The state of nature is neither the law of the strongest nor the inequality of men. Societies are established by the consent of all, that is to say, by a contract for protecting the natural rights of each, for dispatching external business with other societies, and for administering justice within. Man is permitted to alienate only that part of his rights and liberty which is strictly necessary for the maintenance of the association. He particularly reserves to himself that personal liberty which is the first of his rights, and his right to property acquired by work. The essential thing that he abandons is the right of personally administering justice. In constituting a legislative power and an executive power, he maintains his sovereignty and preserves his right to revolution if the contract is violated. Locke desired the separation of Church and State and tolerance for all religions.

Bacon, Hobbes, and Locke are the inaugurators of the English school, a school which is characterised by its practical spirit,

its observation and analysis of psychological facts, and by its disposition to refer the conduct of man to the advantages which he draws therefrom. It led to Adam Smith, who discovers the sanction of morality in altruism or public approbation; to Bentham, who sees it in interest rationally understood; to Hume and the Scottish school; and, finally, to the existing school of John Stuart Mill, Darwin, and Herbert Spencer.

Locke, on the other hand, is also the starting point of the French school of the eighteenth century, which is characterised by a tendency at once anti-clerical, altruistic, and sentimental. We have here Voltaire, Condillac, and the Encyclopædists; Helvétius, for whom "the whole art of legislation is to make it more advantageous for the individual to follow the law than to break it"; Montesquieu, who defined laws as "the necessary relations which are derived from the nature of things"; Rousseau and Condorcet. The Geneva philosopher best expresses that great love of humanity and that great need of individual liberty which was paramount at the dawn of the French Revolution. For him, the social problem was formulated thus: to find a form of association which protected and fostered with the whole power of the community the person and goods of each associated individual and by which each, though uniting with all, obeyed himself only and remained as free as before. Man in the state of nature was essentially gentle; he has been perverted by civilisation. Rousseau accepts the theory of a social contract as did Languet in 1577 and afterwards Hobbes, Locke, and Spinoza, but admits with Locke that certain natural rights, such as individual liberty, are inalienable.

We shall say nothing of the philosophy of the nineteenth century, of the German school which represents speculative philosophy, and of the English school which is physiological in bent, and of which we have the highest opinion. In France, the most notable achievement is the attempt which was made by August Comte.

For Comte metaphysics must be entirely eliminated. The day of intuitions, *a priori* conceptions, entities, innate ideas, is past. If a problem cannot be resolved, it is to be let alone. Psychology is

only a branch of physiology and the latter a division of biology. Morals rest not upon any imperative obligation but upon the altruism which education develops. There are no rights besides those which society confers. Human knowledge has passed through three stages: one of faith or theology, one of conceptions or metaphysics, and one of observation or science.

These, in sum, are the basal principles of science, and would be perfect if the positivist school were faithful to them. But in its own bosom even, there are refractory spirits who suffer themselves unconsciously to be ruled by their sentiments, rather than by observation, and who are constantly lapsing back into the old methods. For example, why should thinkers postulate a social organism similar to the animal organism, which is born, dies, etc.; or a mystical evolution which marches on inexorably towards a given end? Why have they systems of postulates and successive deductions, afterwards seeking the facts which agree with their preconceived opinions? Why have they characterisations or classifications of the sciences founded not on the objects observed but on the synthesis of the observations? The reason of it is that the majority of those whom positivism attracts are men of letters who have not been properly prepared for the search for the truth by practical preliminary studies in the physical and natural sciences. For me, there is but one method of knowing what is and of inducing therefrom what has been and what will be; all suggestions which transgress this method are void.

From this rapid examination of the evolution of philosophy we draw by way of *résumé* the following conclusions:

a. Philosophy, like religion, is the outcome of the belief in the supernatural held by man in his more or less primitive state.

b. The philosophic spirit and the spirit which created the arts and letters have as common characters their subjectivity, their need of imagining and of constructing, and their firm belief in the reality of their conceptions. Between the philosophical spirit and the mathematical spirit there is a further relation. We have mentioned the influence which mathematics exerted on the development of Greek philosophy and that influence persisted after the

Renaissance. Pythagoras and Leibnitz, to cite only two names, were as much mathematicians as philosophers. The first discovered the theorem of the square on the hypothenuse; the second invented the differential calculus. Descartes applied algebra to geometry. The connecting link between the two kinds of mind is the constant preoccupation with the logical order of things and the employment of the deductive method. On the other hand, between mathematicians and symphonic musicians we have also often observed a relation. Like these musicians, the mathematicians and philosophers are harmonists.

c. Philosophy is opposed to science. It answers to the impatient need of man to explain at once things which elude his comprehension.

d. Philosophy, when we clearly see its first expansion, is almost immediately at its culminating point, very likely because it was not yet bothered by science. Gradually it recognised that outside the facts there is nothing solid, but for a long time it could not tear itself from its illusions. At the present day it still lives, but is losing its initial character and sees itself obliged more and more to reckon with science and practice.

e. If with this waning evolution we compare that of the sciences, modest at the outset, slowly and laboriously advancing, but always with a sure and constant tread, and attaining to-day a height which is dazzling but which our grandchildren will regard as low in the extreme,—if we make this contrast, I say, we shall be obliged to say that the group of human faculties which has given birth to philosophy has a less prolonged future than that group which has given rise to science.

f. Philosophy, although on the wane, and apparently in disaccord with the end of the nineteenth century, has nevertheless a beautiful domain to exploit. Taking from it everything that belongs to the domain of facts and to the province of the *a posteriori*, there yet remains for it an important rôle upon which we shall touch later.

13. *The Altruistic Need.*—It remains to speak of the cerebral need which played an essential part in the formation of societies

and which enters into the principles that rule or should rule the societies which are derived therefrom.

Let us recapitulate what we have seen in animals. The first associations not induced by sexual instincts which occur between individuals or groups of individuals, were the result of indifferent circumstances. The habit came, then the pleasure, and finally an instinctive impulse to seek the company again. This may happen in animals of the same species or of different species which have no reason to fear each other, particularly among birds and herbivora. Collisions sometimes take place, but the pleasure of living together outweighs their drawbacks, and mutual concessions are made; the reciprocal need of altruism and of solidarity gains the upper hand. In short, the social instinct is quite remarkable and quite thoroughly consolidated in a large number of animals.

Man, who has sprung from social animals, has inherited this instinct or established need. In a state of nature, when the difficulties of life are simply of a refractory character, when there is room for all, where one has to struggle only with beasts and with nature, man's need of companionship as in the case of Robinson Crusoe before the advent of his man Friday, is the more imperious according as he has a highly developed faculty of exchanging ideas, a faculty which the animals lack, and according as these ideas are multiplied. In this stage, moreover, man has not yet learned to suppress himself. He is entirely spontaneous, he has not yet had experience of the necessity of looking beyond his acts.

At first his family almost entirely suffices to satisfy his need of company and the attendant needs of which we have already spoken. He is a good father, a good husband, and easy in manner, if we except certain savage and reflex habits. Later, when life is still not difficult, and when he lives in little bands, his conduct still remains natural. He yields to his first impulses, he does not analyse them, he has comrades whose company he enjoys in hunting and chatting, neighbors whom he treats as he wishes to be treated; he renders services without asking for anything in exchange; he spontaneously makes sacrifices for others as they do for him. In all things he behaves with frankness and does not know what it is to

lie. He is truly the child of nature. If he is struck he reacts, if he is offended he avenges himself. But without some reason and without being provoked to it, he never commits an injury but often does good. If he is a youth and makes a girl a mother he marries her. If one of the members of his family or one of his friends is attacked he springs to their defence, he identifies their cause with his own. Later, when the families become a clan, and the number of men likely to be found together has increased still more, a change sets in. The altruistic need or the desire for company finding wider scope, is displaced and extended far beyond the limits of the family. The individual prefers the pleasures of his companions to the joys of his own hearthstone; between him and them intercourse of friendship is established; a bond unconsciously unites them. If one is attacked by the members of another community, all rise in his defence.

In these different stages acts having appreciably the same motives are appreciably the same in all circumstances; the response to the same solicitation cannot vary much. All the members of a group or clan accustom themselves to regarding their empirical conduct as the best that can be followed. These acts being repeated become customs, of which all, that is to say public opinion, approve. To conform to that opinion is to act in the best manner. Not to conform to it is to oppose it, and, consequently, to deprive oneself of the approbation of that opinion to which one is sensitive.

The elders, the councils of these tribes, make these customs, which are consecrated by opinion, the basis of their judgments when called upon to settle differences. Tradition becomes the rule, and this receives the sanction of punishments. To obey the rule is good, to disobey it is bad. But if the elders assume the right to judge and punish, and if wrong-doers submit to their decisions, the reason is that the first take it for granted that the individual arraigned before them is responsible for his acts, and that the second are confident that they will be treated on a footing of equality before that tribunal.

In the state of nature man is restricted in his acts only by his

individual will, with or without thought as to their consequences. If he thinks he can kill an animal without being killed or wounded himself, he does so. If he thinks he is running too great a risk, he abstains from the deed. Towards his fellow-being he is not less free to act as he pleases, but more motives go to influence his conduct. One person is congenial to him, another is useful to him, renders him services, amuses him, loves him. Another is indifferent to him; but who knows whether on the morrow their rôles will not be changed, whether that other will then not be of use to him? Will the other not then behave as he himself has behaved? What will his family, what will public opinion say? People will censure him, will avoid him. The savage thus knows what he can and ought to do, and what restrictions he should impose upon his first impulses. The word rights, supposing he has any vague notion of anything of the kind, he would be incapable of understanding. He acts according to the circumstances; his conduct is restricted as regards his game; it is more so when in contact with one of his fellow-beings; it is still more so when in contact with several, and more so again when there are very many, as in societies.

It is the same with his obligations. By the very fact that the savage knows how to modify his conduct according to the circumstances and will consider that such and such acts must not be done, or that he must respect the personality of others, so that they in turn will respect his, that he makes concessions, etc., it is evident that the obligations which he assumes, are made by way of exchange. The whole matter is one of reciprocity. There is no understanding nor contract. Duty is but a word which we apply wrongly to animals; the one comprehends it no more than the other.

In short, among men more or less near the state of nature, acts are produced spontaneously as among animals; they are the best in the conditions given; they are not due to reasoning. The instinct to adapt acts to necessity is the whole thing. The ideas of good and of evil, of responsibility, justice, solidarity, rights and duties, liberty, have no effect upon conduct; they do not exist. The savage, abandoned to himself and untaught, acts empirically,

and his conduct is as correct as ours if not more so. His ethical notions conform to what his daily relations with his fellows demand; his acts are ruder, cruder, and more reflexive, but that is all.

It would be curious to know to what degree his internal sensibility enters into his acts, to what degree man yields to the blind impulse which leads him to long for the society of his fellows, what degree of pleasure he experiences in the sympathy he has for others, or that others have for him; whether he possesses in a developed degree the faculty of representing to himself the pleasure and pain of others, of feeling and sharing them; in a word, to what extent he is altruistic, whether in the first passive degree, which is benevolence, or in the second degree, which is charity (division of H. Spencer and others).

We have pointed out the qualities which savages generally exhibit in the state of nature. When we carefully read not memoirs but the long accounts of travellers and of missionaries who have lived in intimacy with them and have gained their confidence, there is no room for doubt. They are affectionate and devoted. It will be objected that their manners are brutal and that public opinion consecrates with them acts which we severely condemn. But are we ourselves so perfect, and are our manners, though refined, much superior? Witness what has just occurred in Armenia and what the courts daily reveal to us. Among certain savages, for example, public opinion approves of the man who has the courage to strangle a friend in agony in order to spare him useless suffering. Among others, sons abandon without food, or bury alive, their old and infirm fathers, who are incapable of following the nomadic band. But among these same savages, these same old men are listened to and respected, the sons know that their turn, too, will come, and they shed tears when in the last extremity they resolve upon their death. Moreover, facts of this character are rare, and are recounted by travellers because of their extraordinary nature. Savages surely do not understand morals as we do, but they have their morality nevertheless, and one which though different from ours has yet its value. They are straightforword, frank, loyal, and

not wicked. In altruism they are at the same stage as the average run of birds and of herbivorous mammals, and certainly at a degree higher than the generality of civilised races. The impulse which originally moved man to pass from the state of nature or purely family state to the social state was not interest but the need of being happy in the company of others, the need of exchanging ideas and sentiments.

We say originally, for as soon as the contact between men increased, as soon as the conditions of existence became difficult, the character of the scene changed and darkened. The struggle for existence, at first feeble, then gradually increasing in intensity, spreads and grows general among societies, classes, and individuals. To live in new conditions, every day more difficult, where fate has placed one, is ultimately the fortune of every one. Individualism augments, and conversely altruism diminishes. Men are constantly on their guard, weighing their acts. Experience renders them egoistic. To succeed, to rise, to dominate, to become rich, are the ruling passions. The more intelligent a man is, the less in general is his compassion, the more deaf he is to the cries of victims. Here and there a few altruists come to the surface, but they are the dupes. We recall again the saying of Hobbes: *homo homini lupus.*

True, this situation is not entirely due to civilisation. Nature is for the most part, if not entirely, responsible for it. It has made men signally unequal—some crippled, sick, and incapable of the least intellectual effort, others strong, healthy, and intelligent; some envious, hateful, wicked, and truculent, others gentle, loving, and devoted; some predestined from birth to premature death or a long life of suffering; others predestined to success and happiness. Animals have muscles, claws, and teeth, and use them when they are hungry. Man has but one weapon, but more poignant, venomous, and deadly—his intelligence—and he uses it even when he is not hungry to satisfy other needs multiplied a hundred fold by that intelligence. Animals of the same species rarely fight; men rend and devour each other.

Very early, long before Darwin, away back in the dim past, these facts had struck the attention of thoughtful men. In the

councils even of tribes not far advanced, when regulating punishments for deeds considered evil, the effort was made to forestall, soften, and correct them in the interests of the general weal. But as the particular interest of a sect or a monarch gained the upper hand, these efforts decreased; the cause of the feeble, the unfortunate, and the enslaved had none but secret defenders among *élite* men who were more sensitive to their suffering than those about them. At times these defenders were unknown legislators, as in Egypt where we find a few humanitarian laws inspired by lofty ideas of equality; at times they were members of the sacerdotal class who sought to offer consolation to the victims of nature and civilisation, to give them the hopes of posthumous compensation, as in India where the preachers of Buddha said: "Life is but a chain of evils, resign yourselves, conduct yourselves well, your recompense is Nirvâna."

Greek philosophy occupied itself little with the miseries of the classes who were really miserable. Its glance was directed higher; it imagined an ideal of happiness for the sages, an organisation useful for the state, and abided by these propositions. The words "justice," "good," and "evil" bristle in their discussion but in a different sense from that which we give to them nowadays and with reference to the order of nature, of which they see the excellences and not the faults. Aristotle distinguished justice of exchange and justice of distribution, but without insisting upon those unwritten laws which Socrates said were inscribed in the human heart. The Stoics and the Epicureans, as we have said, achieved nothing but the consecration of egoism. Some few legislators of antiquity, like Solon and Numa, appear to have been inspired a little with the moral idea as contrasted with the utilitarian idea which was everywhere predominant.

It was really not until the rise of Christianity that we see the establishment and spread of generous and altruistic ideas having in view not a single class of citizens but the pariahs of society who are so much in need of support and without distinction of class or nationality but bearing upon humanity at large. These were the ideas of love in its universal sense, of fraternity, equality, compas-

sion, charity, and disinterestedness; the distinction of moral good and evil, of private and public conduct, the notion of one's duty towards oneself and towards others. Nevertheless the progress was only superficial. Although legislators strove to inspire themselves with the new principles, their acts did not correspond to them. The masses of the population suffered as much as ever. The struggle was just as implacable, altruism was as sparsely sown as ever.

But after the Renaissance, the ideas which we briefly recapitulated in our review of the history of philosophy, steadily gained headway. The latent principles which should govern the organisation of society were discussed. The notion hitherto so vague, of rights, of individual liberty, unrestricted or curtailed by the social state, gradually assumed shape and solidity. The sentiments of reciprocal duty, solidarity, and responsibility were extended, the double declaration of the natural rights of man in 1776 in the United States and in 1790 in France, opened up a new era—the era of natural rights, that is of those which society cannot abrogate and which involve the correlative duty of respect for those rights in others.

This brings us to the present time at which more than ever the following questions dominate the whole of practical sociology.

On the one hand scientific facts show that nature in placing man at the acme of creation, and in having given him his intellect as his weapon of existence, has at the same time and in the same degree as the other animals, condemned him to an incessant struggle for the satisfaction of his needs, which are even multiplied by that intelligence. At the start that struggle was with individuals of other species, as it is among animals. At present it is carried on in the bosom of the species of itself between man and man, congenitally unequal and not responsible for that inequality. It engenders suffering, misery, and ruin, and divides humanity into oppressors and oppressed, conquerors and conquered.

On the other hand, all that is good in the human heart, love, compassion, generosity, regard for human dignity as a higher animal species, is aroused and protests energetically against this state

of things. It demands that fraternity shall not be an empty word written on the front of our edifices, that justice and peace shall reign, that each shall be recompensed for his efforts, and have his legitimate share in the general happiness, that solidarity shall be a reality.

On the one side egotism is arrayed, the principal factor in the struggle; on the other altruism, the principal factor of concord.

On the one side is the individual, always more or less an animal, knowing only his present life and desiring it to be the best possible. On the other is society, an impersonal and permanent being in which are resumed the experience of the past, the hopes of the future, and the happiness of the present, distributed equitably for the best, among all.

Is the reconciliation of these opposed factors possible? Are we to conclude, as we did in 1893, that science and practice are contradictory, that we cannot guide ourselves in rigorous conformity to truth? Must we admit social dogmas?

What lesson does our knowledge of social evolution up to the present day convey? In which phase of it are we now involved? Which new adaptations are the best? Towards what point on the horizon is our bark turned? Towards what shores will the wind waft us?

This is the subject which we shall examine in our last article which will bear the title "The Social Problem."

P. TOPINARD.

PARIS.

ON SENSATIONS OF ORIENTATION.[1]

THROUGH the co-operation of a succession of inquirers, among whom are particularly to be mentioned Goltz of Strassburg and Breuer of Vienna, considerable advances have been made during the last twenty-five years in our knowledge of the means by which we ascertain our position in space and the direction of our motion, or orient ourselves, as the phrase goes. I presume that you are already acquainted with the physiological part of the processes with which our sensations of movement, or, more generally speaking, our sensations of orientation, are connected. Here I shall consider more particularly the physical side of the matter. In fact, I was originally led to the consideration of these questions by the observation of extremely simple and perfectly well-known physical facts, before I had any great acquaintance with physiology and while pursuing unbiasedly my natural thoughts; and I am of the conviction that the way which I have pursued, and which is entirely free from hypotheses, will, if you will follow my exposition, be that of easiest acquisition for the most of you.

No man of sound common sense could ever have doubted that a pressure or force is requisite to set a body in motion in a given direction and that a contrary pressure is required to stop suddenly a body in motion. Though the law of inertia was first formulated with anything like exactness by Galileo, the facts at the basis of it were known long previously to men of the stamp of Leonardo da

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[1] A lecture delivered on February 24, 1897, before the *Verein zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien*. Translated by T. J. McCormack.

Vinci, Rabelais, and others, and were illustrated by them with appropriate experiments. Leonardo knew that by a swift stroke with a ruler one can knock out from a vertical column of checkers a single checker without overthrowing the column. The experiment with a coin resting on a piece of pasteboard covering a goblet, which falls into the goblet when the pasteboard is jerked away, like all experiments of the kind, is certainly very old.

With Galileo the experience in question assumes greater clearness and force. In the famous dialogue on the Copernican system which cost him his freedom, he explains the tides in an infelicitous, though in principle correct manner, by the analogue of a platter of water swung to and fro. In opposition to the Aristotelians of his time, who believed the descent of a heavy body could be accelerated by the superposition of another heavy body, he asserted that a body could never be accelerated by one lying upon it unless the first in some way impeded the superposed body in its descent. To seek to press a falling body by means of another placed upon it, is as senseless as trying to prod a man with a lance when the man is speeding away from one with the same velocity as the lance. Even this little excursion into physics can explain much to us. You know the peculiar sensation which one has in falling, as when one jumps from a high springboard into the water, and which is also experienced in some measure at the beginning of the descent of elevators and swings. The reciprocal gravitational pressure of the different parts of our body, which is certainly felt in some manner, vanishes in free descent, or, in the case of the elevator, is diminished on the beginning of the descent. A similar sensation would be experienced if we were suddenly transported to the moon where the acceleration of gravity is much less than upon the earth. I was led to these considerations in 1866 by a suggestion in physics, and having also taken into account the alterations of the blood-pressure in the cases in question, I found I coincided without knowing it with Wollaston and Purkinje. The first as early as 1810 in his Croonian lecture had touched on the subject of sea-sickness and explained it by alterations of the blood-

pressure, and later had laid similar considerations at the basis of his explanation of vertigo (1820–1826).[1]

Newton was the first to enunciate with perfect generality that a body can change the velocity and direction of its motion only by the action of a force, or the action of a second body. A corollary of this law which was first expressly deduced by Euler is that a body can never be set *rotating* or made to cease rotating of itself but only by forces and other bodies. For example, turn an open watch which has run down freely backwards and forwards in your hand. The balance-wheel will not fully catch the rapid rotations, it does not even respond fully to the elastic force of the spring which proves too weak to carry the wheel entirely with it.

Let us consider now that whether we move ourselves by means of our legs, or whether we are moved by a vehicle or a boat, at first only a part of our body is directly moved and the rest of it is afterwards set in motion by the first part. We see that pressures, pulls, and tensions are always produced between the parts of the body in this action, which pressures, pulls, and tensions give rise to sensations by which the forward or rotary movements in which we are engaged are made perceptible. But it is quite natural that sensations so familiar should be little noticed and that attention should be drawn to them only under special circumstances when they occur unexpectedly or with unusual strength.

Thus my attention was drawn to this point by the sensation of falling and subsequently by another singular occurrence. I was rounding a sharp railway curve once when I suddenly saw all the trees, houses, and factory chimneys along the track swerve from the vertical and assume a strikingly inclined position. What had hitherto appeared to me perfectly natural, namely, the fact that we distinguish the vertical so perfectly and sharply from every other direction, now struck me as enigmatical. Why is it that the same direction can now appear vertical to me and now

[1] Wollaston, *Philosophical Transactions, Royal Society*, 1810. In the same place Wollaston also describes and explains the creaking of the muscles. My attention was recently called to this work by Dr. W. Pascheles.—Cf. also Purkinje, *Prager medicin. Jahrbücher*, Bd. 6, Wien, 1820.

cannot? By what is the vertical distinguished for us? (Compare Figure 1.)

The rails are raised on the convex or outward side of the track in order to insure the stability of the carriage as against the action of the centrifugal force, the whole being so arranged that the combination of the force of gravity with the centrifugal force of the train shall give rise to a force perpendicular to the plane of the rails.

Let us assume, now, that under all circumstances we somehow sense the direction of the total resultant mass-acceleration whencesoever it may arise as the vertical. Then both the ordinary and the extraordinary phenomena will be alike rendered intelligible.

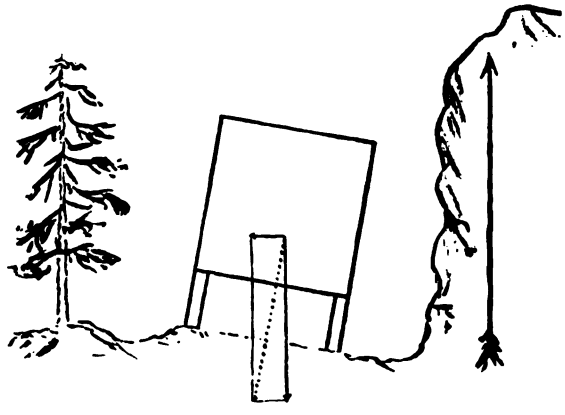

Fig. 1.

I was now desirous of putting the view I had reached to a more convenient and exact test than was possible on a railway journey where one has no control over the determining circumstances and cannot alter them at will. I accordingly had the simple apparatus constructed which is represented in Figure 2.

In a large frame *BB*, which is fastened to the walls, rotates about a vertical axis *AA* a second frame *RR*, and within the latter a third one *rr*, which can be set at any distance and position from the axis, made stationary or movable, and is provided with a chair for the observer.

The observer takes his seat in the chair and to prevent dis-

turbances of judgment is enclosed in a paper box. If the observer together with the frame *r r* be then set in uniform rotation, he will feel and see the beginning of the rotation both as to direction and amount very distinctly although every outward visible or tangible point of reference is wanting. If the motion be uniformly continued the sensation of rotation will gradually cease entirely and the observer will imagine himself at rest. But if *r r* be placed outside the axis of rotation, at once on the rotation beginning, a strikingly apparent, palpable, actually visible inclination of the entire paper box is produced, slight when the rotation is slow, strong when the rotation is rapid, and continuing as long as the rotation lasts. It is

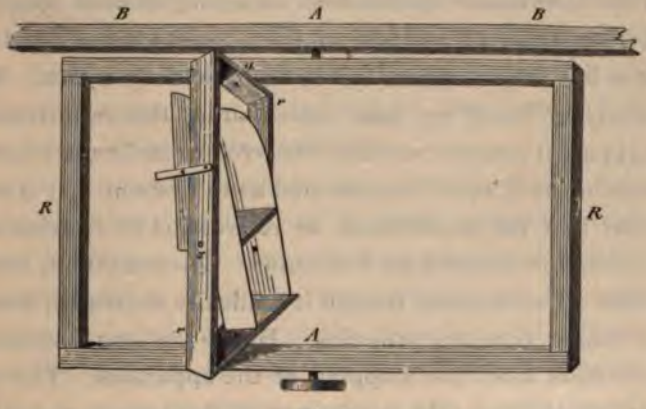

Fig. 2.
From Mach's *Bewegungsempfindungen*, Leipsic, Engelmann, 1875.

absolutely impossible for the observer to escape perceiving the inclination, although here also all outward points of reference are wanting. If the observer, for example, is seated so as to look towards the axis, he will feel the box strongly tipped backwards, as it necessarily must be if the direction of the total resultant force is perceived as the vertical. For other positions of the observer the situation is similar.[1]

Once, while performing one of these experiments, and after

[1] It will be observed that my way of thinking and experimenting here is related to that which led Knight to the discovery and investigation of the geotropism of plants, *Philosophical Transactions*, January 9, 1806. The relations between vegetable and animal geotropism have been more recently investigated by J. Loeb.

rotating so long that I was no longer conscious of the movement, I suddenly caused the apparatus to be stopped, whereupon I immediately felt and saw myself with the whole box rapidly flung round in rotation in the opposite direction, although I knew that the whole apparatus was at rest and every outward point of reference for the perception of motion was wanting. Every one who disbelieves in sensations of movement should be made acquainted with these phenomena. Had Newton known them and had he ever observed how we may actually imagine ourselves turned and displaced in space without the assistance of stationary bodies as points of reference, he would certainly have been confirmed more than ever in his unfortunate speculations regarding absolute space.

The sensation of rotation in the opposite direction after the apparatus has been stopped, slowly and gradually ceases. But on accidentally inclining my head once during this occurrence, the axis of apparent rotation was also observed to incline in exactly the same manner both as to direction and as to amount. It is accordingly clear that the acceleration or retardation of rotation is felt. The acceleration operates as a stimulus. The sensation, however, like almost all sensations, though it gradually decreases, lasts perceptibly longer than the stimulus. Hence the long continued apparent rotation after the stopping of the apparatus. The organ, however, which causes the persistence of this sensation must have its seat in the *head*, since otherwise the axis of apparent rotation could not assume the same motion as the head.

If I were to say, now, that a light had flashed upon me in making these last observations, the expression would be a feeble one. I ought to say, I experienced a perfect illumination. My juvenile experiences of vertigo occurred to me. I remembered Flourens's experiments relative to the section of the semi-circular canals of the labyrinths of doves and rabbits, where this inquirer had observed phenomena similar to vertigo, but which he preferred to interpret, from his bias to the acoustic theory of the labyrinth, as the expression of painful auditive disturbances. I saw that Goltz had nearly but not quite hit the bull's eye with his theory of the semi-circular canals. This inquirer, who, from his happy habit

of following his own natural thoughts without regard for tradition, has cleared up so much in science, spoke, as early as 1870, on the ground of experiments, as follows: "It is uncertain whether the semi-circular canals are auditive organs or not. In any event they form an apparatus which serves for the preservation of equilibrium. They are, so to speak, the sense-organs of equilibrium of the head and indirectly of the whole body." I remembered the galvanic dizziness which had been observed by Ritter and Purkinje on the passage of a current through the head, when the persons experimented upon imagined they were falling towards the cathode. The experiment was immediately repeated, and sometime later (1874) I was enabled to demonstrate the same objectively with fishes, all of which placed themselves sidewise and in the same direction in the field of the current as if at command.[1] Müller's doctrine of specific energies now appeared to me to bring all these new and old observations into a simple, connected unity.

Let us picture to ourselves the labyrinth of the ear with its three semi-circular canals lying in three mutually perpendicular planes (Cf. Fig. 3, p. 86), the mysterious position of which inquirers have endeavored to explain in every possible and impossible way. Let us conceive the nerves of the ampullæ, or the dilated extensions of the semi-circular canals, equipped with a capacity for responding to every imaginable stimulus with a sensation of rotation just as the nerves of the retina of the eye when excited by pressures, by electrical or chemical stimuli always respond with the sensation of light; let us picture to ourselves, further, that the usual excitation of the ampullæ nerves is produced by the inertia of the contents of the semi-circular canals, which contents on suitable rotations in the plane of the semi-circular canal are left behind in the motion, or at least have a tendency to remain behind and consequently exert a pressure. It will be seen that on this supposition all the single facts which without the theory appear as so many

[1] This experiment is doubtless related to the galvanotropic experiment with the larvæ of frogs described ten years later by L. Hermann. Compare on this point my remarks in the *Anzeiger der Wiener Akademie*, 1886, No. 21. Recent experiments in galvanotropism are due to J. Loeb.

different individual phenomena, become from this single point of view clear and intelligible.

I had the satisfaction, immediately after the communication in which I set forth this idea,[1] of seeing a paper by Breuer appear[2] in which this author had arrived by entirely different methods at results that agreed in all essential points with my own. A few weeks later appeared the researches of Crum Brown of Edinburgh, whose methods were even still nearer mine. Breuer's paper was far richer in physiological respects than mine, and he had particularly gone into greater detail in his investigation of the collateral effects of

Fig. 3.
The labyrinth of a dove (stereoscopically reproduced), from R. Ewald, *Nervus Octavus*, Wiesbaden, Bergmann, 1892.

the reflex motions and orientation of the eyes in the phenomena under consideration.[3] In addition certain experiments which I had suggested in my paper as a test of the correctness of the view in question had already been performed by Breuer. Breuer has also rendered services of the highest order in the further elaboration of this field. But in a physical regard, my paper was, of course, more complete.

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[1] *Wiener Akad.*, 6 November, 1873.

[2] *Wiener Gesellschaft der Aerzte*, 14 November, 1874.

[3] I have made a contribution to this last question in my *Analysis of the Sensations* (1886), English translation, 1897.

In order to portray to the eye the behavior of the semi-circular canals, I have constructed here a little apparatus. (See Fig. 4.) The large rotatable disc represents the osseous semi-circular canal, which is continuous with the bones of the head; the small disc, which is free to rotate on the axis of the first, represents the mobile and partly liquid contents of the semi-circular canal. On rotating the large disc, the small disc as you see remains behind. I have to turn some time before the small disc is carried along with the large one by friction. But if I now stop the large disc the small disc as you see continues to rotate.

Fig. 4.
Model representing the action of the semi-circular canals.

Simply assume now that the rotation of the small disc, say in the direction of the hands of a watch, would give rise to a sensation of rotation in the opposite direction, and conversely, and you already understand a good portion of the facts above set forth. The explanation still holds, even if the small disc does not perform appreciable rotations but is checked by a contrivance similar to an elastic spring, the tension of which disengages a sensation. Conceive, now, three such contrivances with their mutually perpendicular planes of rotation joined together so as to form a single apparatus; then to this apparatus as a whole, no rotation can be imparted without its being indicated by the small mobile discs or by the springs which are attached to them. Conceive both the right and the left ear equipped with such an apparatus, and you will find that it answers all the purposes of the semi-circular canals, which you see represented stereoscopically in Fig. 3 for the ear of a dove.

Of the many experiments which I have made on my own person, and the results of which could be predicted by the new view

according to the behavior of the model and consequently according to the rules of mechanics, I shall cite but one. I fasten a horizontal board in the frame *RR* of my rotatory apparatus, lie down upon the same with my right ear upon the board, and cause the apparatus to be uniformly rotated. As soon as I no longer perceive the rotation, I turn around upon my left ear and immediately the sensation of rotation again starts up with marked vividness. The experiment can be repeated as often as one wishes. A slight turn of the head even is sufficient for reviving the sensation of rotation which in the perfectly quiescent state at once disappears altogether.

We will imitate the experiment on the model. I turn the large disc until finally the small disc is carried along with it. If, now, while the rotation continues uniform, I burn off a little thread which you see here, the small disc will be flipped round by a spring into its own plane 180°, so as now to present its opposite side to you, when the rotation at once begins in the opposite direction.

We have consequently a very simple means for determining whether one is actually the subject or not of uniform and imperceptible rotations. If the earth rotated much more rapidly than it really does, or if our semi-circular canals were much more sensitive, a Nansen sleeping at the North Pole would be waked by a sensation of rotation every time he turned over. Foucault's pendulum experiment as a demonstration of the earth's rotation would be superfluous under such circumstances. The only reason we cannot prove the rotation of the earth with the help of our model, lies in the small angular velocity of the earth and in the consequent liability to great experimental errors.[1]

Aristotle has said that "The sweetest of all things is knowledge." And he is right. But if you were to suppose that the *publication* of a new view were productive of unbounded sweetness, you would be mightily mistaken. No one disturbs his fellow-men with a new view unpunished. Nor should the fact be made a sub-

[1] In my *Grundlinien der Lehre von den Bewegsempfindungen*, 1875, the matter occupying lines 4 to 13 of page 20 from below, which rests on an error, is, as I have also elsewhere remarked, to be stricken out. For another experiment related to that of Foucault, compare my *Mechanics*, p. 303.

ject of reproach to these fellow-men. To presume to revolutionise the current way of thinking with regard to any question, is no pleasant task, and above all not an easy one. They who have advanced new views know best what serious difficulties stand in their way. With honest and praiseworthy zeal, men set to work in search of everything that does not suit with them. They seek to discover whether they cannot explain the facts better or as well, or approximately as well, by the traditional views. And that, too, is justified. But at times some extremely artless animadversions are heard that almost nonplus us. "If a sixth sense existed it could not fail to have been discovered thousands of years ago." Indeed! There was a time, then, when only seven planets could have existed! But I do not believe that any one will lay any weight on the philological question whether the set of phenomena which we have been considering should be called a sense. The phenomena will not disappear when the name disappears. It was further said to me that animals exist which have no labyrinth, but which can yet orientate themselves, and that consequently the labyrinth has nothing to do with orientation. We do not walk forsooth with our legs, because snakes propel themselves without them!

But if the promulgator of a new idea cannot hope for any great pleasure from its publication, yet the critical process which his views undergo is extremely helpful to the subject-matter of them. All the defects which necessarily adhere to the new view are gradually discovered and eliminated. Over-rating and exaggeration give way to more sober estimates. And so it came about that it was found unpermissible to attribute all functions of orientation exclusively to the labyrinth. In these critical labors Delage, Aubert, Breuer, Ewald, and others have rendered distinguished services. It can also not fail to happen that fresh facts become known in this process which could have been predicted by the new view, which actually were predicted in part, and which consequently furnish a support for the new view. Breuer and Ewald succeeded in electrically and mechanically exciting the labyrinth, and even single parts of the labyrinth, and thus in producing the movements that belong to such stimuli. It was shown that when the semi-circular

canals were absent vertigo could not be produced, when the entire labyrinth was removed the orientation of the head was no longer possible, that without the labyrinth galvanic vertigo could not be induced. I myself constructed as early as 1875 an apparatus for observing animals in rotation, which was subsequently reinvented in various forms and has since received the name of "cyclostat."[1] In experiments with the most varied kinds of animals it was shown that, for example, the larvæ of frogs are not subject to vertigo until their semi-circular canals which at the start are wanting are developed (K. Schäfer).

A large percentage of the deaf and dumb are afflicted with grave affections of the labyrinth. The American psychologist, William James, has made whirling experiments with many deaf and dumb subjects, and in a large number of them found that susceptibility to giddiness is wanting. He also found that many deaf and dumb people on being ducked under water, whereby they lose their weight and consequently have no longer the full assistance of their muscular sense, utterly lose their sense of position in space, do not know which is up and which is down, and are thrown into the greatest consternation,—results which do not occur in normal men. Such facts are convincing proof that we do not orientate ourselves entirely by means of the labyrinth, important as it is for us. Dr. Kreidl has made experiments similar to those of James and found that not only is vertigo absent in deaf and dumb people when whirled about, but that also the reflex movements of the eyes which are normally induced by the labyrinth are wanting. Finally, Dr. Pollak has found that galvanic vertigo does not exist in a large percentage of the deaf and dumb. Neither the jerking movements nor the uniform movements of the eyes were observed which normal human beings exhibit in the Ritter and Purkinje experiment.

After the physicist has arrived at the idea that the semi-circular canals are the organ of sensation of rotation or of angular acceleration, he is next constrained to ask for the organs that mediate the sensation of acceleration noticed in forward movements. In search-

[1] *Anzeiger der Wiener Akad.*, 30 December, 1875.

ing for an organ for this function, he of course is not apt to select one that stands in no anatomical and spatial relation with the semi-circular canals. And in addition there are physiological considerations to be weighed. The preconceived opinion once having been abandoned that the *entire* labyrinth is auditory in its function, there remains after the cochlea is reserved for sensations of tone and the semi-circular canals for the sensation of angular acceleration, the vestibule for the discharge of additional functions. The vestibule, particularly the part of it known as the sacculus, appeared to me, by reason of the so-called otoliths which it contains, eminently adapted for being the organ of sensation of forward acceleration or of the position of the head. In this conjecture I again closely coincided with Breuer.

That a sensation of position, of direction and amount of mass-acceleration exists, our experience in elevators as well as of movement in curved paths is sufficient proof. I have also attempted to produce and destroy suddenly great velocities of forward movement by means of various contrivances of which I shall mention only one here. If, while enclosed in the paper box of my large whirling apparatus at some distance from the axis, my body is in uniform rotation which I no longer feel, and I then loosen the connexions of the frame *rr* with *R* thus making the former moveable and I then suddenly stop the larger frame, my forward motion is abruptly impeded while the frame *rr* continues to rotate. I imagine now that I am speeding on in a straight line in a direction opposite to that of the checked motion. Unfortunately, for many reasons it cannot be proved convincingly that the organ in question has its seat in the head. According to the opinion of Delage, the labyrinth has nothing to do with this particular sensation of movement. Breuer, on the other hand, is of the opinion that the organ of forward movement in man is stunted and the persistence of the sensation in question is too brief to permit our instituting experiments as obvious as in the case of rotation. In fact, Crum Brown once observed while in an irritated condition peculiar vertigal phenomena in his own person, which were all satisfactorily explained by an abnormally long persistence of the sensation of ro-

tation, and I myself in an analogous case on the stopping of a railway train felt the apparent backward motion in striking intensity and for an unusual length of time.

There is no doubt whatever that we feel changes of vertical acceleration, and it will appear from the following extremely probable that the otoliths of the vestibule are the sense-organ for the *direction* of the mass-acceleration. It will then be incompatible with a really logical view to regard the latter as incapable of sensing horizontal accelerations.

In the lower animals the analogue of the labyrinth is shrunk to a little vesicle filled with a liquid and containing tiny crystals, auditive stones, or otoliths, of greater specific gravity, suspended on minute hairs. These crystals appear physically well adapted for indicating both the direction of gravity and the direction of incipient movements. That they discharge the former function, Delage was the first to convince himself by experiments with lower animals which on the removal of the otoliths utterly lost their bearings and could no longer regain their normal position. Loeb also found that fishes without labyrinths swim now on their bellies and now on their backs. But the most remarkable, most beautiful, and most convincing experiment is that which Dr. Kreidl instituted with crustaceans. According to Hensen, certain Crustacea on sloughing spontaneously introduce fine grains of sand as auditive stones into their otolith vesicle. At the ingenious suggestion of S. Exner, Dr. Kreidl costrained some of these animals to put up with iron filings (*ferrum limatum*). If the pole of an electro-magnet be then brought near the animal, it will at once turn its back away from the pole accompanying the movement with appropriate reflex motions of the eye the moment the current is closed, exactly as if gravity had been brought to bear upon the animal in the same direction as the magnetic force.[1] This, in fact, is what should be expected from the function ascribed to the otoliths. If the eyes be covered with asphalt varnish, and the auditive sacs removed, the

[1] The experiment was specially interesting for me as I had already attempted in 1874, although with very little confidence and without success, to excite electromagnetically my own labyrinth through which I had caused a current to pass.

crustaceans lose their sense of direction utterly, tumble head over heels, lie on their side or their back indifferently. This does not happen when the eyes only are covered. For vertebrates, Breuer has demonstrated by searching investigations that the otoliths, or better, statoliths, slide in three planes parallel to the planes of the semi-circular canals, and are consequently perfectly adapted for indicating changes both in the amount and the direction of the mass-acceleration.[1]

I have already remarked that not every function of orientation can be ascribed exclusively to the labyrinth. The deaf and dumb who have to be immersed in water, and the crustaceans who must have their eyes closed if they are to be perfectly disorientated, are proof of this fact. I saw a blind cat at Hering's laboratory which to one who was not a very attentive observer behaved exactly like a seeing cat. It played nimbly with objects rolling on the floor, stuck its head inquisitively into open drawers, sprang dexterously upon chairs, ran with perfect accuracy through open doors, and never bumped against closed ones. The visual sense had here been rapidly replaced by the tactual and auditive senses. And it appears from Ewald's investigations that even after the labyrinths have been removed, animals gradually learn to move about again quite in the normal fashion, presumably because the eliminated function of the labyrinth is now performed by some part of the brain. A certain peculiar weakness of the muscles alone is perceptible which Ewald ascribes to the absence of the stimulus which is otherwise constantly emitted by the labyrinth (the labyrinth-tonus). But if the part of the brain which discharges the deputed function

[1] Perhaps the discussion concerning the peculiarity of cats always falling on their feet, which occupied the Parisian Academy, and, incidentally, Parisian society a few years ago, will be remembered here. I believe that the questions which arose are disposed of by the consideration advanced in my *Bewegungsempfindungen* (1875). I also partly gave, as early as 1866, the apparatus conceived by the Parisian scientists to illustrate the phenomena in question, One difficulty was left untouched in the Parisian debate. The otolith apparatus of the cat can render it no service in *free* descent. The cat, however, while at rest, doubtless knows its position in space and is instinctively conscious of the amount of movement which will put it on its feet,

be removed, the animals are again completely disorientated and absolutely helpless.

It may be said that the views enunciated by Breuer, Crum Brown and myself in 1873 and 1874, and which are substantially a fuller and richer development of Goltz's idea, have upon the whole been substantiated. In any event, they have exercised a helpful and stimulative influence. New problems have of course arisen in the course of the investigation which still await solution, and much work remains to be done. At the same time we see how fruitful the renewed co-operation of the various special departments of science may become after a period of isolation and invigorating labor apart.

I may be permitted, therefore, to consider the relation between hearing and orientation from another and more general point of view. What we call the auditive organ is in the lower animals simply a sac containing auditive stones. As we ascend the scale, 1, 2, 3 semi-circular canals gradually develop from them, whilst the structure of the otolith organ itself becomes more complicated. Finally, in the higher vertebrates, and particularly in the mammals, a part of the latter organ (the lagena) becomes the cochlea, which Helmholtz explained as the organ for sensations of tone. In the belief that the entire labyrinth was an auditive organ, Helmholtz, contrary to the results of his own masterly analysis, originally sought to interpret another part of the labyrinth as the organ of noises. I showed a long time ago (1873) that every tonal stimulus by shortening the duration of the excitation to a few vibrations, gradually loses its character of pitch and takes on that of a sharp, dry report or noise.[1] All the intervening stages between tones and noises can be exhibited. Such being the case, it will hardly be assumed that one organ is suddenly and at some given point replaced in function by another. On the basis of different experiments and reasonings S. Exner also regards the assumption of a special organ for the sensing of noises as unnecessary.

[1] See the Appendix to the English edition of my *Analysis of the Sensations*, Chicago, 1897.

If we will but reflect how small a portion of the labyrinth of higher animals is apparently in the service of the sense of hearing, and how large, on the other hand, the portion is which very likely serves the purposes of orientation, how much the first anatomical beginnings of the auditive sac of lower animals resemble that part of the fully developed labyrinth which does not hear, the view is irresistibly suggested which Breuer and I (1874, 1875) expressed, that the auditive organ took its development from an organ for sensing movements by adaptation to weak periodic motional stimuli, and that many apparatuses in the lower animals which are held to be organs of hearing are not auditive organs at all.[1]

This view appears to be perceptibly gaining ground. Dr. Kreidl by skilfully-planned experiments has arrived at the conclusion that even fishes do not hear, whereas E. H. Weber, in his day, regarded the ossicles which unite the air-bladder of fishes with the labyrinth as organs expressly designed for conducting sound from the former to the latter.[2] Störensen has investigated the excitation of sounds by the air-bladder of fishes, as also the conduction of shocks through Weber's ossicles. He regards the air-bladder as particularly adapted for receiving the noises made by other fishes and conducting them to the labyrinth. He has heard the loud grunting tones of the fishes in South American rivers, and is of the opinion that they allure and find each other in this manner. According to these views certain fishes are neither deaf nor dumb.[3] The question here involved might be solved perhaps by sharply distinguishing between the sensation of hearing proper, and the perception of shocks. The first-mentioned sensation may, even in the case of many vertebrates, be extremely restricted, or perhaps even absolutely wanting. But besides the auditive function, Weber's ossicles may perfectly well discharge some other function. Although, as Moreau has shown, the air-bladder itself is not an organ of equilibrium in the simple physical sense of Borelli, yet

[1] Compare my *Analysis of the Sensations*, p. 123 ff.

[2] E. H. Weber, *De aure et auditu hominis et animalium*, Lipsiae, 1820.

[3] Störensen, *Journ. Anat. Phys.*, London, Vol. 29 (1895).

doubtless some function of this character is still reserved for it. The union with the labyrinth favors this conception, and so a host of new problems rises here before us.

I should like to close with a reminiscence from the year 1863. Helmholtz's *Sensations of Tone* had just been published and the function of the cochlea now appeared clear to the whole world. In a private conversation which I had with a physician, the latter declared it to be an almost hopeless undertaking to seek to fathom the function of the other parts of the labyrinth, whereas I in youthful boldness maintained that the question could hardly fail to be solved, and that very soon, although of course I had then no glimmering of how it was to be done. Ten years later the question was substantially solved.

To-day, after having tried my powers frequently and in vain on many questions, I no longer believe that we can make short work of the problems of science. Nevertheless, I should not consider an "ignorabimus" as an expression of modesty, but rather as the opposite. That expression is a suitable one only with regard to problems which are wrongly formulated and which are therefore not problems at all. Every real problem can and will be solved in due course of time without supernatural divination, entirely by accurate observation and close, searching thought.

ERNST MACH.

VIENNA, AUSTRIA.

SPECIES-FORMATION, OR THE SEGREGATION OF THE CHAIN OF LIVING ORGANISMS INTO SPECIES.[1]

THE DARWINIAN THEORY of selection furnishes no explanation of the formation of species. It contents itself with the assumption that intermediate forms perish because the newly originated, more perfectly adapted forms displant the old and less perfectly adapted ones. The indisputable objections which have been raised against this explanation are well known. Where the transformation is very gradual, as it is in the great majority of cases, the elimination of the intermediate forms, particularly if the modification affects only single individuals, is, owing to sexual intermingling, quite impossible without accompanying separation in space. But, as I have shown in the case of butterflies (*e. g.*, *Papilio Telesilaus*), new species do originate in the very heart of the distributional area of ancestral forms, and new species have unquestionably arisen everywhere, if not among yet alongside one another, without separation in space.

Darwin's selection cannot explain the transmutation of forms,

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[1] Extracts from an address on *Orthogenesis* (i. e., definitely directed evolution) delivered at the Third International Congress of Zoölogists at Leyden, September, 19, 1895; translated from Professor Eimer's MS. by T. J. McCormack. Professor Weismann's address which was delivered at the same Congress three days earlier and on a similar subject, appeared in *The Monist* for January, 1896, under the title *Germinal Selection*. It has seemed expedient therefore that the views of Professor Eimer, which represent the antagonistic position, should also appear in our pages. We regret that it was impossible to submit the proofs to Professor Eimer. —*Ed.*

nor the origin of new characters in forms; and no more can it explain the origin of species, despite the title of his celebrated book.

The origin of species can be traced to three main causes: (1) genepistasis, (2) halmatogenesis, (3) kyesamechania, all of which will receive their explanation in the following.

(1) By *genepistasis*, or cessation of development, I understand the halting of single forms at definite stages in the path of development whilst others move onward. *Epistasis*, the persistence or standstill of evolution at definite stages, is the main determining cause of the formation of species. It is solely through the operation of this cause that species are everywhere enabled to originate without separation in space. For orthogenesis, i. e., definitely directed and law-conforming evolution, produces the simultaneous transmutation of *numerous* individuals of the same species. And when a large number of individuals thus push onward in their developmental path whilst others remain behind, unavoidably a new species must originate. The evolutionary advancement of a large number of individuals can, therefore, take place in the very heart of the distributional area of the species, provided the advancing individuals are more sensitive than their fellows to the outward influences that condition the transmutation. But the farther the influences under consideration, viz., climatic and nutritional conditions, are removed from the centre of the distributional area of a species, the more powerful is their transformative effect. And the facts of variation for any given species do really show more aberrations and varieties as we recede from the centre of its distributional area, while still farther away new species are observed.

But, conformably to the law of *heterepistasis*, or the cessation of development at *different stages*, single characters may in transforming suffer suspension at a lower stage of development whilst others continue to advance. Heterepistasis appears to me a means of high import for insuring the stability of perfected species and one which is more determinative the higher and more complex the organism is. The interaction and interconnexion of so many widely diverse characters in their capacity as a totality is bound to insure the permanence of the whole for the reason that the characters in

question must necessarily counterbalance each other, seeing that by the very reason of their union as a whole each could not well be transformed by itself, just as in the pendulum of a standard clock the bars of different materials compensate each other during expansion and contraction.

On the other hand, simple organisms, in which few tendencies of development are as yet active, will give rise to less pronounced species, since here the developmental tendencies may even become reversed (*Foraminifera*).

But epistasis, or persistency of evolution at definite stages, is of paramount importance for the origin of species and varieties in the further respect that any individual characters whatever may in the course of enormously long periods of time make their reappearance by way of "reversion" as specific characters. For example, in the plumage of birds there sometimes reappear as specific characters markings which were specific characters in far distant and not at all immediately related ancestors or which only occurred in the down of such ancestors. We are concerned here, accordingly, not with ordinary reversion, which is an occasional phenomenon only and has nothing to do with the characterisation of new species, but with permanent reversion, with permanent phyletic reversion.

At times such old characteristics reappear only in one sex, particularly in the male, when we have permanent male phyletic reversion. Occasionally they appear only in some one part of the covering, for instance, in the ornamental part, or during transformation in the transitional part, when we have metamorphic or transformative reversion.

Such permanent reversion is to be conceived as epistasis or persistence, because the character in question, being according to the biogenetic law subject to repetition during individual development as an inheritance from ancestors, but being only fugitively repeated in the immediate progenitors of the retrogressive species and never making its appearance at all in the adult individuals,—this character, we say, persists and makes its appearance as a distinctive mark of the perfected species.

The explanation of ordinary reversion or atavism, personal

or individual reversion, is implicitly involved in the foregoing. There is concerned here merely the persistence or permanence of single characters, which according to the biogenetic law were obliged to appear only evanescently during ontogenesis, thereafter making way for others.[1]

Atavism is thus naturally classified with the remaining laws of persistence enunciated by me and is explained by them and the biogenetic law jointly. It is simply heterepistatic, ontogenetic, personal cessation of development.

Likewise permanent phyletic reversion is heterepistatic cessation of development—not ontogenetic but phylogenetic. We may characterise the two species of reversion most simply as ontogenetic and as phylogenetic reversion, or as ontogenetic and phylogenetic epistasis or heterepistasis. Both differ from the species-originating process known as genepistasis by the fact that genepistasis signifies a cessation of all the characters embraced by a given definite direction of evolution, the arrestation lying entirely outside of ontogenesis. We enter here again the domain of orthogenesis to which both ontogenetic and phylogenetic reversion ultimately belong.

The biogenetic law,[2] also, is the expression of definite directions of evolution in so far as these have not been altered by the use or disuse of organs in ancestors. Naturally it holds good not only for ontogeny but also for metamorphosis or the period of development persisting after birth or after emergence from the egg. We see here, for example, in the markings of lizards, how one marking is replaced by another in the direction from behind forwards (postero-anterior development, law of undulation), and how the females usually preserve the youthful characters longest or for good, whilst the males first assume new characters (male preponderance). Male

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[1] Compare H. Kohlwey, *Das Gesetz der Vererbung*, *Blätter für Geflügelzucht*, 1886, where the same idea is uttered.

[2] Hyatt is of opinion that the biogenetic law was discovered not by Haeckel but by Agassiz. As a matter of fact, it had been previously clearly and definitely enunciated by Kielmeyer, Mechel, and other Germans. Compare also Schopenhauer, *Parerga*, II., p. 168.

preponderance is simply the advance of the male one evolutionary step further along the path of orthogenesis. In numerous animals investigated by me, the old original characters are found permanently at the front in a fully perfected state, whilst the new ones are found at the rear; as in the markings of lizards, of birds of prey, Papilionidæ, etc. In the sculpturing of ammonites and snail shells the old characters are found on the most primitive whorls, the new characters on the whorls that appear latest.

Perfectly analogous examples may be adduced for plants with respect to the succession of leaves.

A second important cause of the segregation of the natural chain of organisms into species is:

2. *Saltatory development* or *halmatogenesis*, which consists of the sudden, unsolicited appearance of new characters, or, where a large number of such new characters appear, of the sudden origin of new forms that deviate widely from the ancestral form. To what extent direct outward influences are operative here is demonstrated by many facts, such as the sudden, *kaleidoscopic* transmutations of the markings and colorings of butterflies through the agency of heat or cold during development (including horadimorphism or seasonal aberration), the sudden transmutations due to nutrition or general outward conditions of life, as those determinative of the origin of *Amblystoma*. So, too, the conversion of *Artemia salina* into *Branchipus* (Schmankewitsch) shows sudden, graded transmutations. Everywhere here correlation appears as one of the most effective causes of the transmutation of forms.[1]

That separation in space is an influential factor in the origin of species follows immediately from my doctrine of the genepistatic formation of species, and from the effect of outward influences upon transmutation.

Outward influences in their action on genepistatically segregating forms are enhanced as to species-creating power, or as to their power of promoting the creation of species, according as

[1] A distinction is to be made between the kaleidoscopic correlation which is here operative and the functional correlation of Cuvier which relates to the use of parts

separation in space keeps the originating species and the ancestral species absolutely apart, or absolutely prevents sexual intermingling. But no direct, independent significance can be accorded to separation in space as a factor in the formation of species.

As already said, the formation of species may take place in the very heart of the distributional area of the ancestral form, and so be conditioned solely by genepistasis.

Of the highest significance for the formation of species without separation in space, however, is the following factor:

3. *Kyesamechania*,[1] or hindrance to impregnation, the inability of a certain group of individuals to impregnate others than themselves, due to morphological or physiological changes in the seed or ovum or both, or to a change in the time of maturity of the seeds or ova. Changes of this kind occur mainly through correlation, through indirect influence on the sexual organs.

I referred to the phenomenon of prevention of impregnation as early as 1874.[2] Some time later (1886) George J. Romanes lighted upon the same idea and under the name of physiological selection contrasted prevention of impregnation as a factor in evolution with the origin of species by natural selection.[3]

The main factor, finally, that conditions and promotes the formation of species is the activity, the continued use of certain organs. The same result may be obtained by intercrossing, though ordi-

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[1] From κύησις, impregnation, and ἀμηχανία, incapacity.

[2] First in *Zoologische Studien auf Capri. II. Lacerta muralis coerulea*, Leipzig, Engelmann, 1874, p. 45. Then in *Zoolog. Unters. mit bes. Berücks. d. Biologie, I. üb. Bau u. Bewegung d. Samenfaden*, Würzb., Stahel, 1874, p. 42, and *Würzb. Verh.*, 1874. Also in *Variiern d. Mauereidechse*, 1881, p. 257, and in *Entstehung d. Arten*, I., p. 45. In prevention of impregnation there are concerned, according to my opinion, the two following factors: (1) mechanical causes, involving (not to mention such as are founded in the rough structure of the sexual organs) (a) the size of the spermatozoa or the breadth of the oviducts or the varying stoutness of the integuments of the ova, and (b) the varying power and form of movement of the spermatozoa which according to my observation is in vertebrates performed in screw-like motions mostly rotatory. The spermatozoa are, in fact, in closely allied species widely different as to shape and movement. (2) Physico-chemical differences in the composition of sperm and ovum.

[3] *Journal of the Linnean Society*, Zoölogy, London, 1886. *The Monist*, Vol. I., No. 1.

narily this has a levelling and hindering effect in the formation of species.

As for the rest, species are not originated by natural selection but already existing species are preserved by natural selection.

I accept in this unreservedly one part of Darwin's conceptions, as it is stated in the inscription of his book on the origin of species which reads: "The origin of species by means of natural selection, or, the *preservation of favored races in the struggle for life.*"

DEMONSTRATION.

I shall extract the proofs for the views which I have here enunciated, from the facts furnished in my *Formation of Species and the Relationship of Butterflies*, as found in the recently published second part of this work, containing "the forms allied to the Swallowtails."

I distinguish between three groups of Swallowtails: the *Turnus*, *Machaon*, and *Asterias* groups. These groups contain mostly American forms and preponderantly North American forms. *Alexanor* alone in the *Turnus* group occurs in Europe and Asia; the *Machaon* group is represented in Europe, North America, Asia, and Africa. Further, all three live in connected distributional areas and are also all three immediately connected in relationship. The North American *Papilio Eurymedon* belonging to the *Turnus* group, or some similar ancestral form of this same group, forms the starting-point of all the others and at the same time connects them with the *Segelfalter* (*Papilio podalirius*). The relationships involved are mainly inferred from the markings, but the other characters all follow these: venation does not appear to be entirely determinative of the markings. We can tell from the markings, coloration, and shape at once that relationship follows geographical distribution, the fact being that at every remove from the main seat of the phyletic types no matter how small, the forms represent more and more distantly related varieties or species. As we have already demonstrated in the case of the *Segelfalter*, so also in the case of the *Swallowtails*, as a glance at the Plates of the last-named work will show, variations of individuals pass in adjacent areas into aberrations, and in more remote areas into species. The same Plates

(*Swallowtails*) also show that everywhere definite directions of development are determinative of the transmutation. By them are produced, first individual modifications in single forms of a species (aberrations), then varieties, and finally again, species. Now all these directions of development which lead to the origin of aberrations, varieties, and species, have nothing to do with origin by natural selection, nor with sexual selection. The new forms arise without the least regard for utility; every new form of butterfly shows for itself the absolute impotence of natural selection. On the other hand, the facts of geographical distribution with respect to relationship show very distinctly that outward and especially climatic conditions must have been coincidently determinative in the formation of species. This is proved by the fact that *artificial temperatures produce exactly the same directions of development or modifications thereof as the same butterflies exhibit in their actual geographical distribution.* This has been recently shown with perfect clearness by the researches of Standfuss, who by causing heat to act on the pupæ of *Papilio Machaon* in Zürich, produced butterflies such as are found in August in Syria. And here not only changes of coloration and marking but also those of shape as produced by heat in the pupæ agree with the southern forms.

Additional proof of the correctness of my view is furnished by the facts of seasonal aberration, and first by the fact that the summer forms everywhere correspond to the forms artificially produced by heat, and secondly by the fact that the characters of the summer forms of species living farther towards the North are the same as, or closely similar to, the distinguishing characters of allied butterflies which live in the South.[1]

The experiments of Standfuss, Merrifield, and Fischer, as well as the facts which seasonal aberration furnish, show that the explanation which Weismann has advanced regarding the origin of *Vanessa Levana* being a reversion cannot hold water, that this is also true of his explanation of the origin of the dark form of

[1] Compare especially the first part of my *Schmetterlinge*, Sec. "Die Segelfalterähnlichen."

Polyommatus Phlæas, and finally that in all the consequences of the action of heat and light on butterflies we are concerned simply with the *inheritance of acquired characters*, which it was his special object to overthrow.

"On the plates of my butterflies the formation of species and the laws of evolution can be read directly from the wings. The markings and colorings of the same are so many letters speaking a clear and forcible language that no one who wants to know the truth can misunderstand. Like the leaves of an open book the written characters on the wings of our butterflies show their past and present history."

"Here on the tablets of the laws which living nature has placed in our hands, the truth of evolution lies written, and not in the writings of the naturalist philosophers who dream their evolutionary fancies with an utter disregard of the facts, and who scatter them among their credulous followers in unremitting profusion. Mind-made hypotheses are not investigations of nature. No hypothesis is justified in natural inquiry unless it rests upon facts. The man who scorns facts is no natural inquirer." Such were my words in the Preface to my *Swallowtails*.

This handwriting tells us in the most convincing and palpable manner, how one species passes into another, and how the species are segregated. Nowhere has the actual origin of species and the connexion of a concatenated series of species been hitherto so forcibly exhibited and demonstrated as here.

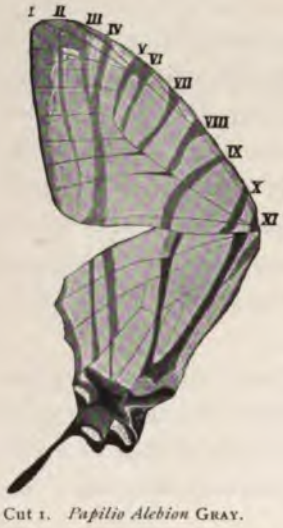
Let us look at the facts more closely.

In the first part of my *Artbildung und Verwandtschaft bei den Schmetterlingen*, in the Section on *Die segelfalterähnlichen Papilioniden*, I have derived the last-named butterflies from forms which had eleven longitudinal stripes on their wings, such as are still shown to-day by certain species like *P. Alebion, Paphus, Glycerion.* Now these longitudinally striped[1] butterflies give, as I am becom-

[1] The objection has been raised on many sides that what I call longitudinal striping in butterflies is really a transversal striping of the wings. And this is quite correct if we speak of the marking of only a single wing. But I speak of the marking of the entire butterfly, of its body, and its two wings, of the front and the hind

ing more and more convinced, the fundamental form of marking of all diurnal butterflies. Partial or total disappearance, broadening and fusion of the fundamental bands condition the formation of the characteristic marks of aberrations, varieties, species, and families. From the transformations of the fundamental bands and the intervening spaces, the ocellated spots also are produced.

In the majority of *Segelfalter* some of the eleven bands have already disappeared or have been shortened from behind forwards.



Cut 1. *Papilio Alebion* GRAY.

Cut 2. *P. Eurymedon* BOISD.

The case is similar with those Swallowtails which are their nearest relatives.

I reproduce here a representation of *Alebion* from above[1] with

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wings as integral parts of a whole. That the wings are a whole with respect to marking is proved by the connexion of the marking in front and behind, in the position which the wings assume when spread out and where the marking and the coloration, owing to the hind wings being covered by the fore wings, are partly wanting. The connexion in question is likewise proved by the mode of transformation or disappearance of the markings from behind forwards, from the hind wings to the fore wings; in other words, by the existence of general laws of marking in such transformation. For details see my *Artbildung*, II., 48, 49.

[1] In the following cuts the left wings always give the upper sides, the right wings the under sides.

its eleven fundamental bands marked by capital Roman numerals, designations which I have everywhere employed in my *Artbildung und Verwandtschaft bei den Schmetterlingen*, and which I shall also lay at the basis of the description to follow. For all the markings of the diurnal butterflies can be traced back to these bands and to the black coloration of the veins.

Also the following cuts of the Swallowtails have been taken from my *Artbildung*. In the footnotes added to the descriptions will be found numbers and plates referring to the corresponding colored cuts of the last-mentioned work.

The form of living Swallowtails which in most likelihood is nearest allied to the initial form of the group, and which is most nearly connected with the *Segelfalter*, namely *Papilio Eurymedon* (Cut 2), has as yet only seven longitudinal stripes; the remaining ones have partly disappeared and have partly been fused at the sides. As in the *Segelfalter*, they disappear in the succeeding species, by orthogenesis, from behind forwards, conformably to the law of postero-anterior development, *Papilio Turnus*, *P. Alexanor*, *P. Machaon*.

In *P. Alexanor* there are, as Cut 3 on p. 108 shows, still seven stripes present either in part or in whole, I, II, III, V/VI, VII/VIII, IX, XI. V/VI is, here as always, situated on the fore wings at the outer border of the middle cell. IX forms with XI an angle, and is on the under side frequently colored black, white, and red, or black, white, and yellow ("ornamental band"). *C* on the outer border of the middle cell of the hind wings like V/VI is here as in other families, *e. g.*, in the Pierids, an extremely important marking, in its origin probably a component part of VII/VIII, which in some *Segelfalter* reappears rudimentarily but in the Swallowtails is a pronounced "*C*-marking."

The remaining transformations of the bands of Swallowtails are the consistent expression of the general law of markings, first in that they exhibit spots which are due to abridgement and lateral fusion as in *P. Machaon* in Europe and North America,[1] and further

[1] Plate VI. Fig. 8.

in that they show rudiments of transversal stripings induced by the blackening of the cross veins (noticeable in other specimens of *Machaon*). These rudimentary transversal stripings are by other agencies subsequently perfected, as in the case of *P. Xuthus* and *Xuthulus*.[1] Here, on both sides of the wings, and that, too, in the forward middle cell, a transversal striping makes its appearance (*a*, Cut 5).

In *P. Hospiton* (Cut 7) there is a rudiment of this new marking present.

Finally unicoloration arises, as follows. The dark coloring

Cut 3. *Papilio Alexanor* Esp. ♀.

Cut 4. *Papilio Machaon bimaculatus* m.

which has made its incipient appearance at the inner wing-angle of *Machaon* extends systematically outwards over the wings and ultimately covers their entire surface, excepting a few spots at the border (*Asterias* group, Cut 6).[2]

We have accordingly a simplification of marking and coloring in the higher forms and not a perfection, as Nägeli's theory and as sexual selection would require. The same holds true of the tails of the hind wings which in the higher forms are not lengthened but shortened. And both facts hold true of the *Segelfalter*.

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[1] Plate VI. Figs. 9 and 10.

[2] Plates VII. and VIII.

The directions of development of these markings show accordingly in their systematic conformity to law the same detailed tendencies as are determinative in animals quite unallied to the butterflies, as in mammals, birds, lizards, mollusks, etc.

The gradual transformation of the markings takes place therefore, as the cuts and particularly the plates of my book show, for the most part through the disappearance, shortening, and lateral fusion of the bands, in which process the upper side as a rule is considerably in advance of the under side which largely retains

Cut 5. *Papilio Nuthus* L. (Under surface.)

Cut 6. *Papilio Asterias* Cram. ♀.

the earlier and more primitive condition,—a result the very reverse of that demanded by the theory of adaptation for diurnal butterflies.

In addition, new bright colors and color-markings and embellishments make their appearance, at first mostly as before on the upper surface, as the bright blue inner marginal band which conformably to postero-anterior development first appears at the back and developing itself on the hind wings afterwards advances forwards (*P. Turnus*, Plate V, *Machaon*,[1] *Asterias*-group[2]). And if

[1] Plate VI. [2] Plate VII.

this band is more pronounced and more beautiful on the under side than on the upper, on the other hand it did not make its appearance there until subsequently when it was either on the verge of disappearing above or had already disappeared (*P. Troilus*,[1] *Palamedes*[2]).

At the inner angle of the hind wings, the ornamental hinder eye, as in the *Segelfalter*, is developed from portions of the mar-

Cut 7. *Papilio Hospiton* Géné.
Under surface.

The three *o*'s on the hind wing indicate the points where orange-red (reddish-yellow) spots lie.

Cut 8. *Papilio Daunus* Boisd ♂.
Under surface.

The four *o*'s on the interior of the hind wings show the places where orange-red spots are situated.

ginal bands, as comparison with the more primitive under side frequently shows, e. g., *Papilio Hospiton* (compare Cut 7 at the point *o* outside the Cut).[3]

Quite remarkable is the slow, systematic production from a fragmentary black band, of a black nucleus in the orange-red hinder eye, particularly in *Machaon* and *Asterias*. Whilst the upper side

[1] Plate VIII. Fig. 2. [2] *Idem*, Figs. 3 and 4, etc. [3] Plate VI. Fig. 6.

is usually in advance of the under side in development, the reverse also takes place, as, for example, in the production of orange-red spots, which again originate first on the posterior part of the hind wings within the innermost black marginal band in the cells of the wing on the under side,[1] as in *P. Machaon* and in *P. Hospiton* (*o*, Cut 7),[2] and further in *P. Turnus, Daunus* (the four inner *o's* on the hind wings of Cut 8[3]), and which gradually increase in intensity of color and in magnitude, to spread finally over the wing cells of the

Cut 9. *Papilio Asterias* var. *Calverleyi* GROTE.

The *o*'s indicate two series of reddish-yellow spots. The *a* shows the nucleus of the hinder eye-spot.

Cut 10. *Papilio Turnus* L. ♀.

fore wings (*P. Brevicauda, P. americus, P. Hellanichus*[4]). In the last-named butterfly they are also present on the upper side, as they are in *Calverleyi* (*o* on the hind wing, and corresponding neighboring spots, Cut 9).[5]

It is noteworthy of *P. Turnus* that these spots appear first more prominently in the female.[6] In *P. Bairdii* the reverse is the case.[7]

[1] Plate V., VI. [2] Plate VI. [3] Plate V. [4] Plate VII.
[5] Plate VIII. [6] Plate V. Fig. 2. [7] Plate VII.

Similarly in the sulphur-yellow spots of the outer marginal band orange-red dots make their first appearance underneath (*Turnus*). In the higher forms these spots are found only in the cells of the fore wings and have disappeared (Cut 9) in the two hind wings (*P. Asterioides* and *Asterias*).[1] The foremost of these spots is in *Turnus* carried over to the upper surface (compare Cut 10, the *o* to the front), as also in *Troilus*;[2] and in the same place, as also rudimentarily in the remaining cells of the hind wings as well as in the hindmost cell of the fore wings, a like coloring appears also in *P. Machaon asiatica*,[3] and it is this coloring that everywhere produces the orange-red of the hind eye-spot in the innermost cell of the hind wings (e. g., *o* in *Turnus Glaucus* ♀, Cut 19, *a* in *Papilio Bairdii* ♂, Cut 15).

An extremely remarkable direction of development in the transformation of the markings is manifested in the fact that on the under surface of *Machaon* rudiments of that streaking of the middle cell of the fore wings first appear which in *Xuthus* and *Xuthulus* become more pronounced in development, are present on both sides, and constitute a prominent characteristic of this species (compare *P. Hospiton*, Cut 7, *P. Xuthus*, Cut 5, and *Hippocrates*,[4] also *P. Machaon æstivus*).

Numerous other systematic and law-conforming transformations of marking and coloring might readily be cited.

Instead of doing so, however, we shall proceed to examine a few *newly appearing* characters in our Swallowtails.

The new characters in question make, as I have already shown for the *Segelfalter*, their first appearance in a very inconspicuous and scarcely perceptible manner. Like all other modifications they are first produced in single butterflies of a species only as aberrations, then they appear as characteristics of varieties, and finally as marks of species.

In this manner certain tiny black dots make their appearance in the cells of the fore wings of Swallowtails, at first partly as marks

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[1] Plate VII. [2] Plate VIII. Fig. 2. [3] Plate VI. Fig. 7. [4] Plate VI.

distinguishing aberrations and partly even as such distinguishing species.

For example, in the forked cell of *Machaon* there is found, usually at both sides, but always on the upper surface, a black point or spot, which is also present and has become a mark distinguishing the species in *Xuthus* and *Xuthulus* and in several members of the *Asterias* group (compare *P. Hospiton*, Cut 7, at *G*; *P. Machaon bimaculatus*, Cut 4; *P. Xuthus*, Cut 11; *P. Bairdii* ♂, Cut 15). In *P. Turnus* ♀ and in *P. Alexanor*, etc., there is found in place of

Cut 11. *Papilio Xuthus* L. (Upper surface.)

Cut 12. *Papilio Machaon asiatica* Mén.

Cut 13. *Papilio Palamedes* Drv. ♂.

Hind wing, under surface. *br*, brownish-red. *b*, blue (blue marginal band).

this an outwardly protruding fragment of band IV.,[1] from which it has doubtless originated. In many *Machaon* (e. g., *Hospiton*) the black spot acquires as a new character a bright space in its centre (compare the cut).

So also in the bright interior of the first lateral margin-cell which lies just behind the forked cell, is sometimes found a very

[1] In the address as printed in the *Compte-Rendu*, page 163, band IV. reads erroneously band V/VI.

small but very distinct dot in some of our native *P. Machaon* (compare *P. M. bimaculatus*, Cut 4). It is likewise found in a butterfly of Allahabad.[1] In *P. Xuthus* (compare Cut 11) it is always present on the upper surface and only seldom as a small transversal streak; it is usually found as a large oviform spot, and from the marking which appeared in *Machaon* as an aberrational phenomenon it has in this last stage been converted into a conspicuous and distinguishing mark of the species.

A new phenomenon is the appearance of a dark outward border on the middle cell of the hind wings, which on the under surface of *Turnus* occupies the entire outer margin, but on the upper surface makes its appearance only as a black line of varying shortness —the *C*-marking as I have termed it and which is very conspicuous for example in *P. Turnus* ♂ (Cut 10 *C*), *Daunus* (Cut 8), *Pilumnus*, but particularly in *Alexanor* (Cut 3 *C*). In *Daunus* ♀ it is present only on the under surface; in the majority of *P. Machaon* the entire border of the middle cell is black also on the upper surface, as it is also in the majority of *Asterias*.[2]

Another new character is the black nucleus in the hinder eye-spot which is already pronounced in appearance in many members of the *Machaon* group, e. g., *P. Zolicaon* and *P. Machaon var. oregonia*, and then in *Asterias*, and whose origin from a fragment of marginal band has already been mentioned. We recognise the first stage of its production in Cut 19 representing *P. Turnus Glaucus* ♀, just above the letter *g*; in *P. Machaon asiatica* (Cut 12) at the letter *a*, and in *P. Palamedes* ♂ (Cut 13 representing the under surface). A more advanced stage is seen in *P. Bairdii* ♂ (Cut 15), to the right above *a*. The nucleus of the hinder eye-spot is completed, that is, perfectly marked off, in *P. Bairdii* ♀ (Cut 18), *T. asterioides* ♂ (Cut 16, both times at *a*), *P. Xuthus* (Cut 11), etc.

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[1] Compare for the case of *Machaon* Cut A at page 26 of my *Swallowtails*.

[2] Colored and even red borders of the outward angle of the middle cell of the hind wings were observed even among the *Segelfalter* in the case of *P. Protesilaus* (*Segelfalter*, Plate I. Fig. 5), but without assuming any further import. As for the rest it was pointed out that the *C*-marking was probably a reappearance (reversion) of a fragment of band VIII.

A new and very marked character, distinguishing the majority of Swallowtails in the broadest sense, finally, is the blue marginal band, the blue spots of which are marked *b* in a number of the following cuts (*P. Bairdii*, *Turnus Glaucus*, ♀ *Palamedes*, *Daunus*, *Asterias*).

Part of these new characters, which in the end appear as fresh marks distinguishing the species, is accordingly to be regarded as a transformation of old characters, whilst another part is entirely new.

Now these new characters, viz., the tiny dots and lines here making their first appearance, can be observed in their first, primitive origin, and can be followed in their development from almost imperceptible markings as they appear here and there in individuals of a species, until they have become fixed as permanent marks of a different species. The ids and determinants of Weismann cannot be seen. But one can palpably and irrefutably see in the faint dots here considered that the transmutation and origin of a species has taken place in diametrical opposition to the theory of determinants. The same is proved by all transformations of existing characters into new distinguishing marks of species. The origin and perfection of new characters, the transmutation and origin of species, take place conformably to law in a few, quite definite directions without any "oscillation"[1] whatever, without any reference to utility; they demonstrate, in fact, the absolute impotency of natural selection in this domain.

One can read from my plates how all the characters of the different varieties and species of swallowtailed butterflies have arisen one from another by orthogenesis. Every variety or species is distinguished by a definite total of characters which have originated orthogenetically from the most inconspicuous beginnings, which through heterepistasis on the one hand, homöogenesis on the other, and finally through halmatogenesis, have been developed and compounded now in this manner, now in that; whilst the upshot of the whole shows that the origin of species essentially re-

[1] See *Germinal Selection*, p. 20, where Weismann contends that the variations presented to selection "oscillate" about a given zero-point.—*Trans.*

poses on genepistasis or cessation of development at different single stages of the evolutionary advance, the process being that one species thus always presents a higher stage of development in its characters than another.

That utility plays no part whatever in the process follows from the nature of the determinative characters themselves, but is particularly demonstrated by the following considerations: (1) In different species of the same phylogenetic line, the various stages of these characters never occur in the same perfection or arrangement; (2) they are equally determinative in different parallel chains of species; (3) they also occur side by side in different sexes in different development; (4) they occur in the same development in different species of one phylogenetic line—apart from the fact that (5) they everywhere make their appearance in the most inconspicuous beginnings, are preserved in faint forms of perfection as distinctive marks of species and may disappear again, and that (6) the complete reversion of all characters so originating, or their concealment through being colored black, that is perfect simplification, may arise.

The significance of heterepistasis for the origin of species is everywhere forced on our notice by my cuts, and I shall draw attention here only to a few special conspicuous features.

In *Machaon* the uniform black coloration of the upper surface of the roots of the forewings has become characteristic of the group. In *Xuthus* and *Xuthulus* this character has not reached its full perfection, although the reverse is the case with the striping of the middle cell of the fore wings, which is rudimentarily indicated only in a few *Machaon*, not having attained there further development. *Hellanichus* receives a very special character from the running over of the orange red color-spot on the under surface of the wings to the upper surface. The *Turnus* have lost much of their original marking, in that the original longitudinal stripes have been not only shortened from behind forwards, but also diminished in width. Particularly the male of this butterfly,[1] which has advanced quite

[1] *Artbildung*, Plate V. Fig. 6.

far in transformation, has been made very bright in this manner. Also in *Machaon* the longitudinal stripes have disappeared from the back to the front, but in this instance the black coloring of the transverse veins has set in.

The widening of the residual stripes of the fore wings and the black coloration on the upper surface of the roots of the same by the fusion of the longitudinal stripes points to a direction of development which is the opposite to that in *Turnus*.

This last direction of development, the appearance of a uni-

Cut 14. *Papilio Turnus* L. ♀.

Cut 15. *Papilio Bairdii* Edw. ♂.

form black coloration on the roots of the fore wings, which even in *Machaon* had begun to extend to the hind wings, continues to spread in *Asterias* to both wings, and in the *Asterias* group makes for unicoloration or perfect black coloration. This progressive blackening offers, coincidently with two instances of saltatory development (halmatogenesis), conspicuous examples of independent similarity of development, homöogenesis, and of female preponderance, whereas otherwise male preponderance is usually determinative. The same phenomena suddenly assumes in *Bairdii*♀ and in *Turnus var. Glaucus*♀ so advanced a stage as to ex-

tend over the entire wings with the exception of a few spots, whereas the average female of *Turnus* is sulphur-yellow in its ground color like the male, and whereas in the males of *Bairdii* the black coloring is only somewhat more extended than in *Machaon*. In other words, the phenomenon which in *Bairdii*♀ and *Turnus Glaucus* spasmodically and suddenly developed, and only in the female, was, beginning with *Machaon*, gradually perfected in the *Asterias* group in both sexes. The black coloring kept extending here from species to species, beginning at the roots of the wings and spreading over their entire surface, at last leaving be-

Cut 16. *Papilio asterioides* Reak. ♀.

b and the three spots situated in the wing cells just above are blue (blue marginal bands).

Cut 17. *Papilio Asterias* Uram. ♀.

hind it only bands of spots of the ground color,—the same as were left in *Bairdii*♀, whilst in *Turnus Glaucus* even these were lost.

The butterflies represented in Cuts 14 to 19 show accordingly a series of different stages of law-conforming transmutation of species, which exhibit not an advance towards beauty and variety, but an advance towards simplicity, towards dark and sombre colorings, such as I have described among the *Segelfalter*, and such as appear widely distributed as we shall see later on among other groups of butterflies. Sexual selection, as being on the face of it absolutely excluded so far as the markings and coloration of butterflies are concerned, is nowise involved here, nor is there any

ground for believing that selection or adaptation is in any way concerned.

The species *P. americus, Nitra, Indra, brevicauda, asterioides,* and *Asterias* figured on Plate VII. of my *Schwalbenschwanzähnliche Schmetterlinge,*[1] show a complete serial line of transformations within the *Asterias* group, and are at the same time conspicuous examples of genepistasis. The highest degree of transformation in this series has been reached by *Asterias,* a species which is almost as far advanced as *Bairdii*♀. *P. Troilus*[2] is almost as far ad-

Cut 18. *Papilio Bairdii* Edw. ♀.

Cut 19. *Papilio Turnus Glaucus* L. ♀.

vanced on the other side and represents an instance of heterepistasis as does also *Palamedes.*

We have figured still another butterfly which is most likely a conspicuous instance of halmatogenesis: *Papilio Asterias var. Calverleyi,* Cut 9,[3] which according to Edwards is probably a cold form of *Asterias.* It has been transformed towards the *Machaon* type in

[1] The cuts given in the present article are in fact a makeshift only, for the purpose of explaining the description. I must refer to the plates of my *Artbildung,* etc., for a full understanding of the facts.

[2] Plate VIII. Fig. 2. [3] Plate VIII. Figs. 5 and 6.

such wise that the black occupies only the inner part of the wings, whilst the broad outward parts of the same have turned yellow or orange-red, the latter color appearing on the hind wings, where the orange-red coloring of the wing-cells which in various other species of the *Asterias* group has been specially developed on the under-surface, attains great importance also on the upper surface.

The black *P. Turnus Glaucus*♀ is as compared with the common bright female type of *Turnus* a more southern form living in warmer regions, so that here also climatic conditions seem to be decisive of transformation. This does not hold, however, for the dark *Asterias*, for these occur also in colder regions. Since female preponderance is determinative of the transformation in *Turnus Glaucus* and in *Bairdii*, and since this transformation corresponds entirely to that of *Asterias*, therefore the influences upon the weaker female sex which in this case is more sensitive must be sought as the cause of the transformation, and the more so because *Glaucus*♀ appears also in the North in isolated cases among the common *Turnus*.

The facts here presented also afford a conspicuous example of the ease with which mimicry may erroneously be assumed and notoriously has been assumed by writers who need it in its full extent for the substantiation of their hypotheses. In the many various species of the *Asterias* group we should have the most beautiful instances of mimicry imaginable, were it not that these species have developed and are now living entirely without biological connexion. What perfect specimens of mimicry *P. Turnus Glaucus*♀, *Asterias*, *Bairdii*, etc., would present to the enthusiastic devotee if he could only furnish the facts of biological connexion! Finally, in strict agreement with the instances which the devotees of mimicry have put forward, not only all the members of the *Asterias* group but also all of the *Machaon* and all of the *Turnus* groups must be regarded as mimetic. And I should scarcely be surprised if Pseudo-Darwinism were really to advance this contention.

It will immediately be evident to the unprejudiced observer, however, that the resemblances are the result of developmental

tendencies, and that independent sameness of development or homöogenesis is determinative of likeness, even in not immediately related forms.

As a fact, there is no doubt in my mind, that when the data have been carefully sifted, it will certainly be shown that by far the greater majority of cases of so-called mimicry have nothing to do with adaptation. It was to this purport that the entomologist Hahnel spoke long ago, from actual numerous observations which he had made in South America in nature; whereas Erich Haase[1] without having looked to actual nature at all, has recently set up no end of cases of mimicry on the basis of outward similarity between butterflies, and wrote a whole book on the subject. But it stands to reason that resemblances of this character, quite apart from the question of their origin, can prove nothing for adaptation. The demonstration of adaptation in nature itself is alone decisive.

As to the origin of actual cases of mimicry the same cannot possibly be explained by selection, and what Herr Weismann has recently said[2] about *Kallima* as a marvellous product of selection loses all its demonstrative force when opposed to the plenitude of facts which go to show that orthogenesis everywhere determines the shaping of characters and is in this manner enabled to produce the resemblance to a leaf on the under-surface of a butterfly, and that homöogenesis is able to bring about the greatest resemblance between two butterflies which do not live together at all—a phenomenon of which numerous cases are known.[3] There is similarly nothing marvellous about the systematic and proportionate extension of the leaf-marking of *Kallima* from the fore wing to the

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[1] Erich Haase: *Untersuchungen über die Mimicry auf Grundlage eines natürlichen Systems der Papilioniden.* Kassel, 1894.

[2] International Congress of Zoologists at Leyden, Sept. 16, 1895. *The Monist*, Jan., 1896. *Germinal Selection*, Chicago, 1896.

[3] Piepers in the entomological section of the Leyden Congress of 1895 referred to cases of this kind. Thus, *Junonia Asterie* of Java is like our *Hipparchia Megæra*, and *Junonia Erigone*, of the same locality, resembles our *Hipparchia Egeria*, so that in both cases mimicry would would have been assumed if the like butterflies had lived together. Further facts will be given later.

hind wing while skipping the posterior margin of the fore wing so far as this is covered by the hind wing. The same phenomenon is everywhere noticed and is obviously a consequence of the action of light or of lack of light. Selection can create nothing new. It can only work with what is already present. Once the similarity of the wings of a butterfly to a leaf has been produced, it can be useful and further development can then doubtless be favored by selection. The origin of the resemblance, however, cannot be due to accidental variation, which is supposed to have all possible characters ready for selection. *Kallima's* resemblance to a leaf is determined by a thousand and one details. Not one accident but a thousand accidents *together* would have been requisite, and would have had to present themselves suddenly, in order to produce this resemblance by the selectional agency of Darwinism. The resemblance to a leaf could not have gradually arisen by selectional means; it must have originated suddenly and in approximate perfection in order to have given selection any hold for its operations.

There is no chance in the transmutation of forms. There is unconditioned conformity to law only. Definite evolution, orthogenesis, controls this transmutation. It can lead step by step from the simplest and most inconspicuous beginnings to ever more perfect creations, gradually or by leaps; and the cause of this definite evolution is organic growth.

TH. EIMER.

TUEBINGEN.

PROFESSOR F. MAX MUELLER'S THEORY OF THE SELF.

THE PFERDEBUERLA.

AN INTERESTING DISCUSSION of philosophical problems in a popular form appeared lately in the *Deutsche Rundschau* under the strange title of *Das Pferdebürla* by Prof. F. Max Müller. In it the famous Oxford Professor prints a letter from a German-American reader of his in Pennsylvania, who, being a native of Silesia and a farmer plowing his fields with horses, not with oxen, signs himself *Das schlesische Pferdebürla.* The letter of our Pennsylvanian countryman is an exquisite piece of common sense; it is in many respects crude, but shows a healthy disposition of mind and an excellent temper. He has had many troubles to encounter in life, but has never lost his good humor. Considering the transiency of life, he does not mind the buffets of outrageous fortune and is prepared to meet the end joyfully. He finds that the evil in the world is constitutional and indispensable. Thus he hails badness as well as stupidity, for life would be tedious if all people were virtue-machines. As matters are, he says, we enjoy the merry fight and cherish dear ideals in our bosom. He expresses his joy at the liberalism of the Professor, but he doubts whether he is truly free, which he expresses in such sentences as these:

"Max, du bist vielleicht auch noch ein Gottesfabler. Die englische Atmosphäre mag dir zur Entschuldigung dienen! . . . Max, ein ganz Freier bist du immer noch nicht."[1]

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[1] There is a special touch of humor in Pferdebürla's employment of the familiar *du* with the great Oxford Professor.

Prof. F. Max Müller is one of the most accomplished controversionalists not only of the present time but of all times; and if he understands anything he understands the art of condescension. He can argue condescendingly with dukes and other personages of high social rank, but it requires a special grace to condescend to the Pferdebürla, and the Professor has succeeded in doing it. He replied to the Pferdebürla's criticism in a long private letter, which, however, remained unanswered up to the publishing date of the June number of the *Deutsche Rundschau*. Did the Pferdebürla die in the meantime, or was the letter not properly addressed? We cannot tell.

The humor which pervades the controversy between the Pferdebürla and the Professor is merely an external feature, the essence of the controversy is quite serious and of a deep interest, philosophical as well as practical. The Pferdebürla sums up his opinion in these words (pp. 204–205):

"Modern life is for every one who has an open mind a real high school. Max all the German scholars, or at least the majority of them, are still under the illusion that man's spirit is a prius. Not at all, Max! Spirit is a development, a phenomenon of evolution. One should think it impossible that a thinking man who has ever observed a child could be of another opinion. Why shall we seek ghosts behind matter. Spirit is a function of living organisms, and a goose and a chicken possess it also. But why, Max, should we not merrily be satisfied with the limits of our cognition, as conditioned by experience, and surrender the infamous fable-making and tyrannical lies? The sole love which I at my fiftieth year still cherish in my bosom is the unsatiable, dear longing for that truth which fate has denied us."

The Pferdebürla is an unschooled but by no means an ignorant man. His education is apparently autodidactic and unsystematic, but he is well read and knows not only such works as Omar Khayyam but also Schopenhauer and Dühring. He appears to contradict himself by first positively declaring that spirit is a development, that it is useless to hunt for ghosts, that we must surrender the invention of fables and lies, and then speaks of his longing for the truth which fate has denied us. If the views he proclaims are not the truth, how can he wind up the confession of his faith with the declaration that truth is not forthcoming? And if there is mys-

tery left, why does he not recognise the fact that there is a reason for inventing fables. His philosophy must be very one-sided for "the truth which fate has denied him," remains after fifty years still his sole love and he cherishes it dearly in his bosom.

PROF. F. MAX MUELLER.

Now, we ask: What has the great Sanskrit scholar to say in reply to the Pferdebürla's criticism? The Professor gives the Pennsylvania farmer all the information he asks for, and sets forth his reasons for still believing in ghosts.

Prof. F. Max Müller's letter to the Pferdebürla is interesting because it is the quintessence of his philosophy and the gist of his religious confession of faith.

Prof. F. Max Müller is a philologist, and his whole method of thought is philological. His philosophical arguments are ultimately based on reflexions upon linguistical relations. He recognises the permanence of universal types such as dogs, men, trees, etc. These types, or Platonic ideas, are the thoughts behind the things, and the great philologist argues: "If there are rational thoughts in nature, there must be also a rational thinker," and this rational thinker must be "in, above, and behind nature."

The same argument is repeated in other forms with reference to natural selection, evolution, and every event that takes place, especially in man's activity of the senses. If there is natural selection, there must be, according to Prof. Max Müller, some one who selects; for there can be no choice without a chooser, and every happening presupposes an agent that causes it. Seeing, hearing, touching, would be impossible if there were not a receiver of sensations.

Prof. F. Max Müller's theory is a very old theory; it is the doctrine of Self as taught in ancient Brahmanism; and he frankly confesses that it is practically the same doctrine as the theory of the ghost-soul. He adds: "Ohne solches Seelengespenst kommen wir nicht aus!"

Prof. F. Max Müller's ghost is not as substantial as the ghosts of spiritualists, but it is just as real. It is not definite, but quite in-

definite, and would thus be very accommodating; but its existence is nevertheless earnestly insisted upon. It is practically nothing but a personification of the unknown quantity, which cannot be found in matter and energy. The Professor says:

"Names do not name him. That is true. Perhaps it had been better to call him *x* or the Unknown One. But if we only know what we mean, why not call him spirit or *spiritus*, i. e., breath. You call him the spook, or *Seelengespenst*. The Brahmans seem to me to have found the best expression, they call him the *Urgrund* of the soul, of the ego, 'Self' and the *Urgrund* of the non-ego of the world-soul, of God, the highest Self. They go further, and regard both these two Selfs as ultimately the same Self."

The theory of self, or, as it is called in Sanskrit, "âtman," dominated the philosophy of India until Buddha came and taught the doctrine of the "anâtman," basing upon the illusoriness of the notion of self his ethics of universal compassion and love. Buddhism flourished for about a thousand years in India, and this period was the age of highest development of Indian art, science, and poetry. Even the ancient productions of Brahmanical literature received their final shape during the Buddhist period of Indian history. After Buddhism was expelled from India, the philosophy of the âtman was systematised by Shankara, and became again predominant in the minds of the Hindus. Modern Hinduism is saturated with the belief in the âtman, and all Hindu religion to-day is practically an âtman philosophy mythologically expressed.

What is the âtman theory weighed in the balance of science?

The assumption of a self within, above, and behind things is simply the reification (or hypostatisation) of the unity that originates by a combination. It is a personification of actions and processes and may thus be considered as mythology taken seriously. A wrong interpretation of language is perhaps at the bottom of the whole mistake. We say "the wind blows," and the metaphysical philosopher would have to regard this process, which is nothing but air in motion, as an action performed by an agent. There is the blowing that takes place and there is the wind, which is the agent that does the blowing. Sensations take place in the eye, thoughts are being thought in the brain. They are, according to

Prof. F. Max Müller, actions of a seer, a hearer, a thinker, who is the self of the man, who is that which is behind his soul, who is his âtman. When we ask ourselves, What is a watch? we come to the conclusion that the watch is not the dial, nor the hands, nor the spring, nor the wheels; but a peculiar combination of all these parts so arranged that the spring carries the hands around on the dial in a regular and definite adjustment to point out the time. According to the âtman theory we ought to say, Here are a number of wheels, a spring, a dial, and hands, none of these parts is the watch. The watch itself is an unknown quantity within, above, and behind the watch, and we call it "the watch in itself" or "the âtman of the watch," or the "watch-self." As to the actions of all these parts we ought to know that not the spring exercises a pressure, but the watch-self in the spring; and not the hands turn round the dial, but the watch-self turns in the hands.

The Buddhist philosopher, Nagasena, has brought out the anâtman theory very clearly in his discussion with King Milinda in the carriage simile. The sage claims that persons are "name and form" and nothing else, not selfs possessing a name and form, and Milinda challenges him on the ground that this theory implies the non-existence of personality. Nagasena asks the king concerning all the parts of the carriage—whether they are the carriage, and when he denies these questions, he concludes (in the same way as the king did concerning the non-existence of personality) that the carriage must be non-existent. This *reductio ad absurdum* proves that the personality of man too is a combination of certain qualities and the assumption that there is a self within, above, and behind the man is redundant. The anâtman theory does not deny either the reality of the carriage or of personalities, it only denies that the unities which originate through combination are selfs, âtmans, or things in themselves.

The philosophy of the Brahmans is (to use a modern term) metaphysicism; Buddhism is anti-metaphysical. The metaphysical philosopher is a philologist who reifies the words which he has coined by abstraction to denote actions or combinations or universal types. Thus reality appears to him as merely phenomenal

and the word by which he denotes this reality, the thought (or *noumenon*) which signifies it, is supposed to be the reality behind the phenomenal appearance. The reality behind the phenomenal is therefore called the noumenal, or thought-existence, and thus while reality is degraded into a mere sham, the mental reflexion of things is supposed to be the sole true reality.

This theory leads to a dualistic world-conception which divides the world into the noumenal and the phenomenal. A monistic view is regained only by a mental annihilation of the phenomenal. The corollaries of this view as characterised by Prof. Max Müller are as follows:

"What do we do with our senses? They seem to be our wings, but if closely analysed they are our fetters, our prison walls."

"We live in a prison, in a den, as was said already by Plato."

"Some philosophers say: Indeed our senses may be limited, but our understanding, and especially our reason, are unlimited; and they recognise nothing that would surpass them (understanding and reason)."

"There is nothing that justifies us in saying that this self has had a beginning and that it will have an end. The ego had a beginning, so has the *persona*, the temporal mask which develops in the present life, but not the self which wears the mask."

"Everything which is called ego, personality, character, etc., has developed upon earth; it is earthly, but not the self.

"What remains is the eternally One (*das ewig Eine*)[1], the eternal self, which without beginning and without end animates all of us.

"The self is the bond which unites all souls, the red thread which runs through all existence, and the recognition of which alone affords us a recognition of our true being.

"'Know thyself' means to us no longer know thy ego, but know what lies beyond the ego, know the self—the self which runs through the whole world, through all hearts, which is the same for all men, the same for the highest and the deepest, the same for creator and creature, the âtman of the Veda, the oldest and truest word for God.

"Fellow-man is fellow-self."

Speaking of evolution, and of his adversaries who advocate the ape-theory of the origin of species, Prof. F. Max Müller says:

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[1] A better translation might be "the eternal onehood."

"They have taught us that the body in which we live was first a simple cell. What the word 'first' in this connexion may mean is another matter which need not concern us here, but this cell was really what the word signifies, the cella of a silent hermit, the self.

"Within this cell there is a shining point (*ein heller Punkt*), and beyond this shining point our microscopes cannot go, although whole worlds may be contained in it.

"If we accept the cell-theory in its ultimate conception, what sense can there be in the late Henry Drummond's proposition (in his *Ascent of Man*, p. 187) that the progenitors of birds and the progenitors of men were at a very remote period one and the same? Would not a little *quantum* of strict logical thought at once cut off the bold hypothesis that we derive our origin directly or indirectly from a menagerie. Every man and also the whole of mankind has passed through its own uninterrupted evolution on its own account. No man, no human cell originates in the womb of an ape or any animal, but only in the womb of a human mother fecundated by a human father. Man does not owe his origin to an abortion."

* * *

Having recapitulated some salient features of the âtman theory which as stated by both Shankara-charya and Prof. F. Max Müller, stand in contradiction to modern science, we ask, "Is the notion of a self a mere illusion, or is there a truth hidden in it?

We believe there is a truth hidden in the idea of a self, for while there are no things in themselves, the organisms and other unities which originate by combination are not nonentities. They are realities. The Brahmanical âtman conception of the self is an inflated value, but the self of a man, his personality, is a very important fact. There is no metaphysical self, but there is a real self, and the error of metaphysicism cannot be overcome by denying the existence of the self but by explaining its true nature.

III. IDEAS, THE ETERNAL TYPES OF THINGS.

Prof. F. Max Müller combines his theory of the self with a Christianised version of Plato's doctrine of ideas as seen in the light of mediæval Realism:

"Behind all things lies the thought or the idea. If there are rational thoughts in nature there must be a rational thinker. Behind all trees, oaks, birches, pines lies the thought, the idea, the form, the word, the logos of a tree. One can never see a tree, one sees only an oak, a birch, a pine, never a tree! But the thought,

or the idea of the tree confronts us in all trees as realised and multiplied. The same is true of all things. No one has ever seen an animal, a man, a dog, but only a St. Bernard, a greyhound, a beagle, and closely considered not even these. What is the constant, the ever returning in dogs, that by which they all resemble one another, the invisible form in which they all are cast? That is the thought, the idea the logos of dog. Now, is there a thought without a thinker?

"Where do we have a tree except in our conception? And what do conceptions consist of, if not of our sensations; and these sensations, imperfect though they are, exist only in us, for us, through us. The perceived object itself is and remains to us outside, transcendent, thing in itself—everything else is our work.'

In another passage the Professor declares, closely following Schopenhauer's[1] argument, against the doctrine of evolution: "Every species represents an act of will, a thought," and he adds, to indicate that every species is rigid, "An diesem Gedanken kann nicht gerüttelt werden, so nahe auch oft die Versuchung liegt."

Prof. F. Max Müller would allow us to doubt all the articles of faith in religion but one. He says: "One fundamental article must remain. There is a thinker and a governor in the world."

This is a strange mixture of Realism, Nominalism, Schopenhauerianism, Platonism, Paleyism, and what not.

In the dictionary we can group words, we can classify them in categories and no one is allowed to take away an iota from a word; but in reality the types of things fluctuate. The baby, the child, the youth, the man, are quite definite types of different ages, and no one can be allowed to mix them up. That is a good rule for a grammar lesson, but in practical life we find them changing from one into the other in spite of Prof. F. Max Müller's protest. The same continuity holds good in the distinction between genus and species. The dog is a species of animal, and the poodle is a species of dog. He who knows something about dogs will be able to enumerate a goodly number of poodle-species. Why we should see the lower species only, as Prof. F. Max Müller declares, and not the genus to which it belongs, is a mystery which I suppose

[1] Schopenhauer was a bitter enemy of the doctrine of evolution and ridiculed Lamarck severely for having propounded it. That was before the days of Darwin.

means that the concrete dog only is seen, but the generalised concept dog is thought and not seen.

The truth is we *do* see a dog in every poodle, as well as in every St. Bernard, in every beagle, and in every greyhound. The type dog is fully and completely in every genuine dog. It is true that the idea dog, as a concept, is our own work; but a general idea is not an addition to the things but an abstraction from our perceptions. It is a mental symbol expressed by a sound which signifies the general features of a number of sensations. The genus dog is not more complex than the species poodle, it is simpler; the higher genus quadruped is still simpler, and the general term animal is the simplest of all. These concepts are not made by additions, but by omissions. The incidental features are dropped and the essential ones retained, but the more general is always contained in the less general; the type is always present in the concrete object from which it has been abstracted. The universal exists in every one of its particular representations.

What is the idea of a tree but a special form of thought, a combination of mental activities of a peculiar kind which represents certain objects of our experience? The idea of a tree is our concept, but is the tree in our conception alone and nowhere else? Certainly not. The concept tree is alone in our conception, but the tree is outside; the tree is that which the concept of a tree has been invented to signify. Ludwig Noiré argues well in favor of the theory that man alone, being a speaking animal, can conceive the idea of a tree; no animal is in possession of ideas. But Noiré would scarcely have denied that for that reason animals can see trees.

That the objects of our sense-perceptions remain outside is true; none will deny that, but they are for that reason not transcendent in the philosophical sense of the word; they do not remain unknown and unknowable. They are not things in themselves in the Kantian sense. The idea of a tree, if it be a correct conception and appropriate representation of the object in question, constitutes our knowledge of the tree. For what is knowledge if not correct representation.

REASON.

Prof. F. Max Müller regards it as obvious that "we can as little go beyond the horizon of our senses as we can jump out of our skin." He makes this statement to prove the limits, not of the senses, but of our understanding and reason. Everybody knows that the senses have limits, but as it is difficult to understand what the limits of reason are, the Professor declares that reason is nothing but addition and subtraction, and, pillorying the exaggerated reverence in which reason is frequently held, he adds: "When people, even philosophers, speak of reason as if it were a jewel "which could be placed in the drawer of the human cranium, they "are myth-mongers and nothing else." Arguing from Locke's famous dictum that there is nothing in our intellect which has not before been in our senses, F. Max Müller concludes that in spite of the extensions of our horizon by addition and subtraction we feel everywhere our limitedness, our ignorance, which, considering the limitedness of our senses (these prison walls in which the self is confined), cannot be otherwise.

Now it is true that our senses are limited, but it is not true that reason is limited.

Reason, by the bye, is not addition and subtraction, but any purely formal operation, especially combining and separating. Addition and subtraction is one particular kind of reason, viz., arithmetical ratiocination, it is a quantitative combination and separation, but there are also qualitative combinations and separations which do not result in sums, but in new products. The composite memory-picture, or concept, of a tree, for instance, is not a mere addition of several sensations in which every single impression remains intact, but a fusion in which the particular features are blurred and that which is common in all of them, the type of a tree becomes prominent and distinct. The concept of a tree is something novel in the domain of sentiency. It is not contained in its several sensations, but is as new as a new-born baby, and

must be regarded as a new person in society. The rise of concepts is not a miracle, but it is the necessary result of a combination.

While I gladly grant that Reason is a very simple operation, —analysed in its simplest functions, it is nothing but a combining and separating,—I cannot approve of Prof. F. Max Müller's derogatory remarks concerning Reason. To be sure Reason is not a jewel that can be locked up in a drawer, but it is much more than a jewel; Reason is not a lamp, lit in the brain; it is much more than a lamp, it is all the intellectual light we have; Reason is not a goddess to be worshipped by the mob (as proposed during the French Revolution); Reason is much more than a goddess. There is no need of showing contempt for anything because it is simple. Reason is the more wonderful the simpler it is, and the feats of Reason are not less important because they are as plain as daylight, obvious in their truth, transparent as glass, and as unlimited as are the operations of counting and measuring.

Reason can indeed go beyond the horizon of our senses and our comprehension can, after all, fly on the wings of Reason into spheres that will remain forever inaccessible to our senses. Does Prof. F. Max Müller not know of the discovery of Neptune, the existence of which was positively known to Leverrier, even before Galle directed his telescope to the place where the planet had been calculated to be? Is that not a going beyond the horizon of our senses?

Prof. F. Max Müller has frequently uttered disparaging remarks concerning the reverence people show for Reason, but he himself assumes always a worshipful attitude when speaking of the Logos. What difference is there between Logos and Reason, except that the former is Greek, the latter Latin? The former slipped into the New Testament, the latter into the terminology of philosophy and of common speech; the former has thus become a theological expression, the latter the party cry of Liberals. Shall we denounce Reason as ungodly and sing hymns to the divine Logos? Let us be fair and recognise the truth wherever it is, and let us boldly acknowledge that the Logos that was in the beginning, the Logos that is eternal and omnipresent, is simply combination and

separation; or, as Prof. F. Max Müller would have it, addition and subtraction. But if the Logos is so simple, let us beware lest we have a contempt for it. Its simplicity does not make it less divine, but is only one more reason to glory in its divinity.

FORMS IN THEMSELVES, NOT THINGS IN THEMSELVES.

Kant was a great philosopher, but his idea of the unknowableness of things in themselves is, after all, a great error, based upon the argument that purely formal thought, being *a priori*, is purely ideal. Kant's misconception originates by unconsciously identifying the terms "ideal" with "subjective." Every thinking being can construct in his own mind the mathematical laws that govern the motions of stars; hence Kant concludes that the mind dictates these purely subjective laws to the objective world; it is so constructed that it cannot help contemplating the world as being in time and space and as being subject to the categories of Reason, especially the necessary connexion of events, called causation. If form were a mode of thinking only and not a quality of the objective world, then of course, the objective world would be unknowable and we could never know what things are in themselves. But if formal thought is only one special case of form that finds its analogies everywhere in the world; if the congruence of the laws of purely formal thought with the purely formal laws of nature, is the result of a sameness of operation in two different spheres, then the things are knowable and there is no cause for despairing of reason and its applicability to nature.

The conception of things in themselves is a materialistic conception of the problem; the very term is misleading. That which constitutes the suchness of a thing, its peculiar character is its form and nothing thingish, nothing that has anything to do with matter or substance of any kind. Therefore the thing in itself, the self of the thing can, properly conceived, mean only the form of the thing; and the form of the thing is its type, its logos, its noumenon, and here we agree with Prof. F. Max Müller's recognition of the eternity of all the logoi. The forms of things exist not only

in and with the things in which they are actualised, but are eternal types; they constitute a superreal reality, a supercosmic order of things, a supernatural nature of existence; they are the absolute that governs all relations, the uncreated that shapes all things, the unconditioned that conditions every event, every action, every being.

The forms of existence are not single entities; they are not separate, so that one can not change into another. They constitute one continuous system and admit very well of evolution from lower simple types to higher and ever higher types. Nor can we say that the eternal logoi, or ideas are products; they are not as Prof. F. Max Müller claims, *Machwerk* manufactured by a *Macher*, a manufacturer. They are not creatures, they are uncreated. They are not made by God, they are God themselves. The ancient Christian dogmatists denied that the logos is a manufacture; to them the logos was uncreated, but (as they expressed it) was the only begotten son born of the Father from eternity and equal to Him in divinity.

The world of forms is not chaotic, but definite and determined. We can imagine all kinds of forms, but those forms which are possible are limited according to law. The first instance of the determinedness of form is found in the chemical elements which are very limited in number. The chances of divergency increase in the spreading branches and higher complications of the tree of life, but they too are limited in their possibilities to definite types, and the laws of life are rigid according to the law of causation. In the highest sphere of life when reason appears incarnated in speech, we are again confronted with definite laws of rational action, resulting finally in a clear conception of life and its aims which will naturally find expression in moral endeavor. Whatever things or beings originate, they are always mere realisations of the eternal order of the universe. All creation is, in this sense, an actualisation of possible types. Every invention is (as the word indicates) a finding out of a form which existed from all eternity as a possible combination, viz., as a form itself, only that it had not as yet been known.

The watch, the steam engine, the dynamo, are forms of existence which as pure forms are eternal types that must be discovered if they are to be actualised in concrete existence; and in this sense they are indeed as Prof. F. Max Müller says, within the things, behind them, and above them. The difference between Prof. F. Max Müller's view of things in themselves, and this view of forms in themselves, is simply this, that the former is tinged with metaphysicism and mysticism, while the latter is both anti-metaphysical and antimystical.

THE SELF OF MAN.

Having seen that the selves of things are not metaphysical essences or entities, but consist in the forms that constitute their type and condition their suchness, we are naturally led to the conclusion that man's self also is the form of his being; and there is nothing that can be adduced to contradict this proposition.

Personality, says the Buddhist philosopher, is name and form; and the continuity of life, according to the maturest results of physiology and psychology, is conditioned by a preservation of form. The continuity of a man's personality is based upon his memory and memory is the psychical aspect of a preservation of cerebral structures. Hence we can justly say that every man is a certain form realised in a bodily incarnation. The material of which this form is composed is constantly replaced by new material, and indispensable though it be for bodily appearance, it is yet of merely incidental significance. In other words, we are not what we eat, but we are the form into which the food we eat is moulded.

Man's personality is based upon a preservation of form. The form of our organs of sense, our brain-structures, our life-memories is that which continues while the matter and the energy which we use pass through the system of our body in a constant and rapid transit. We may say that matter assumes a certain shape, but it is more correct to say that a certain shape assimilates a certain amount of matter. At any rate, a man is as little the matter of which his body consists, as ideas are the ink in which the words that express them are written. Nor is man the breath (or *Hauch*)

which passes through his lungs. Not even the feelings *qua* feelings can be said to be the properly human of man. Every animal, even every amœba is sentient, it is possessed of feeling. Human sentiments are definite forms of feeling.

Everywhere form is the essential feature that makes a thing what it is, and even sentiency such as it obtains in living creatures as a characteristic feature of animal-life must be due to a definite form of organisation.

The doctrine of self is, to Prof. F. Max Müller, the cornerstone of all religion and the essence of all philosophy, but when he enters the field of ethics the tables are turned, and the self is dismissed. He says:

"At any rate, we agree that everything that is done from love of God and our neighbor is good; everything that is done from a seeking of self is bad."

Prof. F. Max Müller's theory of self serves him only as a philosophical comfort for the lovers of self, but finds no application in ethics.

Self-seeking is wrong, as we all agree,—except such philosophers as Nietsche and Steiner; and yet in a certain sense self-seeking is not wrong. Indeed, the preservation of self and its further evolution to higher stages is a duty. Professor F. Max Müller's self, being the same forever and aye, cannot grow, but the real self (that which, according to Professor F. Max Müller, is only the phenomenal self), the totality of soul-forms of man, can by new insight acquire new features; it can degenerate, but it can also improve and be added to. And in this sense ethics is a seeking of self; it is self-culture, but all self-culture is simply the realisation of the eternal pattern of perfection.

The type of a rational being is an eternal form of existence which can be realised in life. That which constitutes the humanity of man is *not* a feature which descended upon him from brute ancestors. The ape lacks rationality, and in this sense I can frankly agree with Prof. F. Max Müller in his objections to certain one-sided assertions of naturalists. That something which begot the humanity of man is the eternal Reason, the Logos, the Rationality

that was developed in his soul when he began to systematise his experiences. Man's begetter, in this sense, is not his brute progenitor, but the eternal order of the universe, which naturally and appropriately, and indeed justly and most beautifully, is symbolised under the allegory of a divine Father.

* * *

We have touched upon the salient features of the problem of self, and have only to indicate in conclusion that all the religious and moral aspirations of man receive in this solution, as offered by the Philosophy of Form, a more exact and scientific explanation. The immortality of the soul appears in a new light, the idea of God is purified of paganism and mythology;[1] and the moral code, especially the apparently anti-natural ideal of universal good will—including the love of enemies—is found to be rooted in the eternal conditions of existence.

POSTSCRIPT.

It is not a habit of mine to write postscripts, but I have a remark to make which does not properly belong to the subject matter of this article.

Prof. F. Max Müller expresses a desire to know "what the origin may be of the old proverb, 'much cry and little wool,' which is heard so frequently in England." He continues: "At last I dis-"covered that there is a second line to it, viz., 'As the Devil said "when he shore the sow,' for there was in that operation much cry "and little wool on the part of the sow, but only bristles." In reply to Prof. F. Max Müller's question I have to say: The proverb is originally German, "*Viel Geschrei und wenig Wolle*," and the word *Geschrei* stands for *Geschererei*, or shearing. There are a great number of similar Low-German sayings which have by a change of dialect ceased to be understood in their original form and are now current in a perverted version. As analogous cases that fall in the same category and may be of interest, are the proverbs, "*Zu nacht-*

[1] The problem of the idea of God is treated in the current number of *The Open Court*, October, 1897.

schlafender Zeit," which means literally "at night sleeping time," while the original form *nachtschlafende tiet*, means "night sleeping people," the word *tiet* being the same word as *Diet*—people, from which *dietisch* or *deutsch*, i. e., "the people's language," has been derived. Another similar perversion is found in the proverb "*sein Schäfchen ins Trockene bringen*," literally to "bring one's little sheep into the dry," i. e., to shore, but the Low-German form, *Schepken*, means "little ship." Finally, we may mention the German chess term, *Läufer*, for bishop, which means literally "runner," but is a perversion from *Lepel*, spoon. The Saxon peasants called the bishops "spoons" because they were commonly carved, like spoons, in imitation of a bishop's mitre.

EDITOR.

LITERARY CORRESPONDENCE.

FRANCE.

LIKE all the works of M. RIBOT, his *L'Evolution des idées générales*[1] is distinguished by unusual clearness and simplicity. We may state its purpose and conclusions in a few lines, as in fact M. Ribot himself has done.

The principal aim of his work, he tells us, is to follow the progress of the mind when it abstracts and generalises, to show that these two operations already exist in perception and progressively attain, by stages which we can define, the highest forms, the pure symbolism which is accessible to a few only. He states in concluding that "the object of thought by concepts is to substitute for complex states simplified states," signs which are easily manipulated but which contain a store of real though latent knowledge; and that "the psychology of abstraction and generalisation is thus in great measure a *psychology of the unconscious.*"

M. Ribot then proceeds to follow, step by step, the degrees of abstraction; he exhibits the evolution of this process of the mind and indicates here three grand stages: that of *generic images* (the *recepts* of Romanes which the latter ranks between the simple percept and the concept); that of *intermediate abstracts;* and that of *higher concepts.* In the lower forms of abstraction (among animals, children, and uneducated deaf mutes) the word cuts no figure, does not exist in fact, the mind is still occupied with the concrete. In the intermediate forms the word begins to play a rôle. In the

[1] F. Alcan, publisher.

higher forms, finally, it passes to the loftiest plane. It is even characteristic of the concept not to be "representable," which of course does not mean that it has not its root in representation.

Association and dissociation are the two types of intellectual activity. The act of abstraction belongs to the second type, being in its negative aspect the elimination of objects and in its positive aspect their psychical reinforcement. The natural mechanism, writes M. Ribot, by which the separation between the strengthened elements and the weakened elements in perception is effected, is a rough primitive sketch of what will later be abstraction. The same forces are in play and are reducible ultimately to the imparting of a particular direction to the attention. On the other hand experience remains the groundwork of our concepts. General terms cover a latent organised knowledge constituting the hidden capital without which we should be in a state of bankruptcy, manipulating counterfeit money or valueless paper. "General ideas are habits in the intellectual order." In sum, the useful work is performed beneath consciousness. Nothing is noticeable but results, indications, or marks.

It would be a supererogatory task to enumerate the interesting and profound *aperçus* which these pages contain on many questions of psychology, on language, gestures, counting, and zoölogical classifications, the history of which, M. Ribot ingeniously remarks, proceeds hand in hand with the evolution of generic ideas. I will not repeat here the psychological analyses of his work but restrict myself to indicating its philosophical scope,

The results of these researches are evidently unfavorable to the doctrines that are more or less vaguely classed as spiritualism, idealism, contingence, etc. Besides, M. Ribot carefully avoids all controversies which would lead him away from his subject, in which he has completely sunk himself. There is nothing more instructive, furthermore, from this point of view than the special study which he gives us in the second part of his book of the concepts of number, space, time, cause, law, and species. He shows us, for example, that "space is infinite only in potency, which potency is in us and in us only"; that "the voyage to the end of space of

which John Stuart Mill speaks is tantamount to a voyage to the end of mind"; that "space conceived as infinite is reducible to the power which the human mind possesses of constructing series, thanks to the abstraction which enables it to grasp the law of their formation." He asserts that "consciousness is the necessary condition of any conception whatsoever of time, which appears and disappears with it." Finally and particularly, he attributes to the notion of cause its purely scientific signification. "The antecedent is not one thing and the consequent another thing: they are two manifestations, differing in time, of a single fundamental identity." The facts of thermodynamics offer the best example of this conception. There remains, it is true, another meaning for the notion of cause. Some conceive it not as an invariable relation of antecedent and consequent, but as a thing which acts, creates, is modified or persists amid all transformations and assumes all manner of masks. Now cause, thus understood, if it is to remain intelligible, "can," M. Ribot reminds us, "only be imagined or represented under the form of muscular effort, which is its origin and remains its type." It remains a fact of internal experience rather than a concept and the secret of the future will be to ascertain if there is room by the side of mechanical causality for any other form of causality.

To explain as much as possible by actual practical experience and by evolution, is the method from which M. Ribot never swerves. Let us follow it as long as it yields us results. It is an old weapon, say some of our young philosophers who hanker after metaphysics; but it at least never fails to bring down its game.

* * *

In M. TARDE'S *L'Opposition universelle, essai d'une théorie des contraires*[1] we have not only a work which is utterly different from that of M. Ribot, but we have in its author an utterly different type of mind. M. Ribot is clear, simple, sparing of words and effects. M. Tarde is complicated, and at times difficult. He has enthusiasm, brilliancy, and great reserve power. Particularly is this true

[1] F. Alcan, publisher.

of his present instructive work in which the question of contradictions is treated with originality though without giving the reader of its four hundred pages the impression that it has been exhaustively handled.

M. Tarde defines *opposition* as follows: "when two variable terms are such that one cannot be conceived as becoming the other unless it traverse a series of variations that end in a state zero and then ascend again that same series of variations through which it previously descended,—then those two terms are opposed." These terms may belong, further, to different orders of facts. It will be necessary, therefore, to distinguish qualitative and quantitative oppositions, and among the latter dynamic oppositions: some being objective or mechanical in character and reducible to the type of two movements in contrary directions along the same straight line; others being subjective in character and reducible to two kinds, the force of denying as opposed to the force of affirming, and the force of refusing as opposed to the force of desiring.

Two things, whether they coexist or succeed each other, cannot be absolutely the same, if not in matter at least not in space and in time. Among all the possible situations in which they meet, they oppose each other. Opposition thus appears as a particular case of universal existence: a case with a hundred different aspects, inasmuch as it comes to pass for almost all existence (contrarieties of motion, direction, velocity, resistance, energy, desire, etc., etc.). But the contrarieties specially strike us when they are concerned with the actions of living beings, for then the *variations* which they provoke have an unusual importance for our practical life, and affect our sensibility as well as our reason.

The different forms of social opposition (war, for instance,) have long since claimed the attention of M. Tarde. He has directed his researches towards the understanding of these forms in view of their possible attenuation. He establishes, doubtless, the gradual transformation, in societies, of relations of adaptation into relations of opposition, or *vice versa*. But he is constantly bent on making fecund harmony prevail over destructive work, and re-

ligions have no value in his eyes except in so far as they contribute to this result.

Should we not recognise "at least the transitory utility of certain imaginary or ultra-terrestrial objects of desire and faith for reconciling terrestrial desires and ideals? Are they reconcilable at no other price?" This, for M. Tarde, is the great problem. The optimistic solution of Guyau, the "*laissez-faire* ethics," do not inspire him with confidence. As to the possible harmony of fundamental truths he also remains quite sceptical. Reflecting on how man works, enjoys, or suffers in the pursuit of his dreams, he even risks the following disheartening question: "The pursuit of the impossible through the agency of the useless: can that be the last word of existence?" But these *useless* things serve a purpose if they keep up the desire and the illusion of the *impossible!*

It is a very curious work in fine, full of insights, and exacting on the reader's powers of thought. The new questions always lead back to the old problems.

* * *

M. STRADA has not let us wait for the book which he announced, *La religion de la science et de l'esprit pur, constitution scientifique de la religion.*[1] He had already traced its general outlines and enunciated its fundamental thought. For M. Strada, as our readers know, *method* explains history, and history is divided from this point of view into three epochs of which each carries the mark of a dominating criterion: faith (fideism), personal evidence (rationalism), and finally the fact (impersonalism, which the author proclaims). Now, if we consider religious events from the same point of view we shall see that the so-called positive or revealed religions correspond to the fideistic period because they transfer the criterion to mediators who have been deified (Buddha, Jesus, Mohammed, etc.); the so-called natural religions correspond to the rationalistic and critical period, because they attribute the criterion to a man, a scholar, the founder of a school; but that the religion of science can exist only by the impersonal method, be-

[1] F. Alcan, publisher

cause then the Fact alone, the objective, indestructible Fact, becomes the sole foundation of certitude and constitutes at once science and religion.

I have pointed out already the analogy of this conception with the law of Comte (the law of the three stages,—theological, metaphysical, and positive) and shall not revert to it. How does M. Strada conceive the relation of religion and science? Clearly enough, in the same manner that I have presented it here, and without any great novelty. Religion, he writes, is the emotion of science. It is always and everywhere proportional to it. "When "I say the emotion of science I say simply the emotion, the senti- "ment, the felt consciousness of science so far as ascertained. . . . "This profound sentiment must arise in the face of science, since "it is born of the vague apperception of its hypotheses. Religion, "therefore, belongs to all epochs of humanity. It follows the state "of science, for it is naught but the emotion which springs from "the state of knowing. . . ."

Let us observe here that according to M. Strada man started with monotheism; polytheism, being the result of analysis, must have come later. "Monotheism," he writes, "is the first conception of religions by virtue of its inherent sentiment of an unknown fatal force which is always and everywhere present and affirmed." One might object to this point that the vague sentiment of force is one thing, and the affirmation of a single, absolute God another. It appears to conform more to a sound psychology and to observation, that man should first have incarnated "power" in the things which strike him, in the natural phenomena which menace him, and that he should have come only by degrees to the abstraction of force.

But let us quit this dispute. What is God, according to M. Strada, and how do we perceive him? It is the Fact, he says, which reveals God to us; the Fact is the realisation of the idea of God, and it is hence the idea of God which man thinks in thinking the Fact. "If the dead painter has put his idea into a painting, if the father in dying puts his idea into the letter which he writes to his son, the spectator, the son, in seeing these facts—the paint-

ing, the letter—lives in the thought of the painter and the father, though he will never again see the painter or the father! This is how the mediating fact establishes the relation between God and man. Simple-minded people feel this in life without reasoning. Thus they efface themselves with humility before the unknown, incommunicable God, from whom they experience a mysterious, secret communication of power."

God, says M. Strada further, is the absolute, preantinomic or affirmation of which our logic stands in need—pure spirit which it is no longer necessary to separate from the world, which it is not necessary to suppose coeternal with matter. The author will revert to these questions. But always and everywhere science is the mother of true religion and religion itself, because it alone makes us know God and live in God.

I shall pass by the details of this work—a solid production containing many beautiful passages, although full of fatiguing repetitions. M. Strada has certainly convictions. He never doubts that he has given to the world the truth which will save it, that he is the Bacon and the Descartes of future times, and he honestly believes that his *methodical impersonalism* is a novel procedure which scientists have never heretofore followed! Yet what does the scientist do who constantly begins anew his experiences and resumes unceasingly his labor, if not to patiently interrogate the *Fact*, to submit and declare it the sole master, the last guide, and the expression of the laws of the universe? M. Strada has the merit which I gladly accord to him of precisely formulating the situation; he will not have lived without exercising an influence nor without having left behind him some trace.

* * *

I recommend a good work by M. André Cresson, *Sur La Morale de Kant*—a study in which M. Cresson shows clearly both the logical defects in the moral system of Kant and the falsity of his principles, and ends with the conclusion that this philosopher of genius, by the very originality of his attempt "has done nothing but prove more clearly than ever the impossibility of discovering

an ethics which is not founded on the rational science of human nature or on a religious metaphysics."

I also recommend a work by M. L. DAURIAC, *La Psychologie dans l'opéra français* (*Auber, Rossini, Meyerbeer*)—a study not in musical criticism, as M. Dauriac tells us, but of musical psychology, wherein, however, he abides by the ordinary methods of criticism and seems to me to insist a little too much upon grounds of sentiment.

To be mentioned finally are, a new edition of M. V. BROCHARD'S *De l'erreur; Nature et moralité* by M. CHARLES CHABOT; *La modalité du jugement*[1] by M. LÉON BRUNSCHWICG—a study on the value of our theoretical and practical judgments, the whole of which constitutes on the one hand the work of perception and the edifice of science, and on the other the development of the individual will and progress of the moral life. And particularly is to be noted a special edition of the *Sociology* of Auguste Comte which has been epitomised by M. RIGOLAGE (JULES RIG); a publishing enterprise which has its significance, and which will not remain unnoticed.

LUCIEN ARRÉAT.

PARIS.

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[1] All these works are published by F. Alcan.

CRITICISMS AND DISCUSSIONS.

AUTOMATISM, DETERMINISM, AND FREEDOM.

Mr. Arthur Harington's courteous criticism of my discussion of automatism shows that I have failed to make my position clear. Regarding, apparently, the term "automatism" as synonymous with "determinism" in the sphere of animal life, and disregarding the fact that I was contending for a more restricted usage, he endeavors to place me on the horns of a dilemma. "Either then," he says, "Prof. Lloyd Morgan must give up his present belief that 'the organism yields to the strongest prompting' or his conclusion that actions, whether of animals or men, cease to be automatic, that is, mechanical and 'determined,' when they are the result of 'conscious selection and choice'." But since for me "automatic" is *not* coterminous with "determined" I am not prepared to plead guilty to the charge of inconsistency implied in the sentence just quoted.

Let me try to make my exact position as clear and free from all ambiguity as a very condensed statement allows.

Many organic activities are such that, quite apart from any experience, a given stimulus, or group of stimuli, gives rise to a more or less definite and stereotyped response. Such response is automatic in the sense in which I use the term. But there are other activities which, though none the less determinate, are not automatic. Intelligent behavior, based upon the data afforded by previous experience, is not automatic. In such intelligent behavior cerebral centres or their equivalents (let us call them control-centres) are called into play by which response is either augmented or inhibited. But in contending that behavior in so far as it is modified by the functional activities of these control-centres ceases to be automatic, I am far from contending that it ceases to be determinate. The action of the control-centres I believe to be neither more nor less determinate than the action of the automatic centres. Their activity is the determinate outcome of the physiological impulses by which they are called into play. In this sense, as Dr. Waller contends in the passage which Mr. Harington quotes, their activity may be said to be of the same fundamental nature as reflex action. I do indeed question the wisdom of applying the term "reflex action" to voluntary and intelligent behavior—but that is another matter. In any case I should say that the action of the control centres though determinate is not automatic.

Now, if determinism and automatism as applied to animal activities, are synonymous, the latter term is redundant and may be abandoned. But it is more than redundant; it is confusing. To say that a man who receives a letter offering him a certain position, and who, after careful consideration telegraphs his acceptance—

to say that such a man acts automatically does not appear to be a satisfactory use of the term, when we already have "determinate" to express the belief that in his decision he yields to the strongest motive.

My suggested terminology (omitting the secondary automatism of habit) may now be summed up in the following scheme:

Reflex action.	Instinctive activity.	Intelligent behavior.	Rational conduct.
Automatic		Voluntary	Volitional
Determinate.			

A word or two may be added concerning "freedom." Mr. Harington regards any reconciliation between freedom and determinism as "hollow and unreal." Here again everything depends on the meaning we attach to our terms. If "free" is antithetical to "determinate" of course no "reconciliation" is possible. In any given case we must either have freedom or determinism; we cannot have both any more than a glass can be both full and empty at the same time. But if we use—as I contend that we should use—"freedom" in antithesis to "external constraint," both have their place in a scheme of determinism. That which is intrinsically determinate is free; that which is extrinsically determinate is under external constraint. Otherwise stated, freedom is immanent; not-freedom is due to the influence of environing forces. The notion that the activities of nature are externally caused is part of the metaphysics of special creation; and the idea that determinism is synonymous with external constraint is a legacy of that metaphysics. Given an organism as a self-constrained mechanical system. If we regard this system as a whole we may say that under the influence of a stimulus or group of stimuli it responds in a certain determinate fashion. When it is not let nor hindered from effecting the response it is free; if in any way or in any degree its free response be interfered with it is not free, but under external constraint. But if we regard the higher animal as comprising (1) an automatic system and (2) a controlling system, then the automatic system, in so far as its action is augmented or inhibited by the control-centres, is under constraint. Its free action is interfered with and the controlling system, in so far as its inherent activity is interfered with by external influence, is under constraint. When it is not thus interfered with it is free to exercise its inherent power of determinate control. The man in the street who claims freedom to act as he chooses in response to the strongest prompting, puts forward a claim for his cerebral centres which in my judgment cannot be gainsaid. And if some one objects that his acts are after all determinate, he may well reply: Assuredly they are; but just in so far as they are determined by the intrinsic activity of some precious ounces of grey cerebral matter, their freedom is immanent in the system of my brain and its concomitant consciousness.

Again summarising in schematic form we have:

Intrinsic activity	Activity enforced by the environment
Free	Constrained
Determinate.	

C. LLOYD MORGAN.

BRISTOL, ENG.

BOOK REVIEWS.

KARL ERNST VON BAER UND SEINE WELTANSCHAUUNG. Von *Dr. Remigius Stölzle*, Professor der Philosophie an der Universität Würzburg. Regensburg: Nationale Verlagsanstalt. 1897. Pages, 687. Price, M. 9.

Karl Ernst von Baer was born in Esthonia, on the 17th of February, 1792, of an old German family which had emigrated from the Fatherland to Russia in the middle of the sixteenth century. His instruction prior to his fifteenth year was confided mainly to private tutors; afterwards it was continued at the academy in Reval, and at the Universities of Dorpat, Vienna, Würzburg, and Berlin. In 1814 he became doctor of medicine at Dorpat, but being dissatisfied with the facilities offered there, he proceeded to Vienna, Würzburg, and Berlin, where his studies gradually tended away from medicine to natural history and biology. It was at Würzburg that he enjoyed the opportunity of studying under Döllinger, who lectured on comparative anatomy, and of intercourse with the philosophical botanist Nees von Esenbeck, who found little difficulty in winning the interest of the gifted young scientist for the fascinating speculations of the *Naturphilosophie*, then captivating the best intellects of Germany. In 1817 he accepted the position of prosector at the university of Königsberg, where he remained seventeen years unfolding and publishing his greatest discoveries. His researches, consonantly with the universal character of his mind, covered an enormous field, and embraced animal and human anatomy, zoölogy and anthropology, paleontology, and much work in practical social fields. It was here that he developed his main ideas of scientific embryology of which he is regarded the founder,—notably his doctrine of types of organisation (a development and verification of Cuvier's work), his discovery of the ovarian ovum of mammals which definitively settled the old controversy between evolution and epigenesis, at least in its old conception, his discovery that the embryos of the higher vertebrates repeat in development the embryonic forms of their lower predecessors, the significance of which was made clear by Darwin's researches, and was afterwards extended into Haeckel's fundamental biogenetic law, etc. In 1834 he accepted a call to St. Petersburg, where, despite his dislike of his surroundings, he developed an enormous activity. His geographical and ethnographical researches were alone sufficient to have made a scientific reputation.

Besides this, he continued his old work, made extensive scientific journeys into remote parts of Russia, and wrote books of travel. His participation in the practical, actual work of life was also extremely varied during his St. Petersburg sojourn, and marks a characteristic side of the man's life. He combated with might and main the seclusiveness of German professors, and contrasted their shyness to appearing in public life and participating in public instruction, to the contrary state of affairs in England and France. On all practical questions and enterprises his advice was sought and given with a wealth of knowledge probably second only to that of Humboldt in his age. He spent the last years of his long life in Dorpat, engaged to the end in unremitting and fruitful labors. He died there in 1876, leaving behind him a legacy to humanity which few men can equal. At the celebration of the sixtieth anniversary of his doctorate he modestly says in words which remind us of Helmholtz's utterances on a similar occasion: "I have discovered much, and my success has been great. But when I think of the manner in which I have accomplished it all, I can only say that it was through a fortunate combination of circumstances, and through the favorable shaping of my life."

This attributing of success to destiny in life, which marks the utterances of so many great discoverers, is in Baer's case especially characteristic. He had in him, we may say, a tendency to fatalism which explains much of his philosophical bias. For example, his position in St. Petersburg having from its inappropriate environment been uncongenial to him, he remarks that he had never in his life accomplished anything by his own free will and by his own initiative; all that he had achieved had been thrown in his way by chance. It was chance that had drawn him away from medicine to science, chance that he became prosector in Königsberg, chance that by his friend and colleague's disappearance from the field he had become a full professor and so been put in a position to make his discoveries. As our author, Professor Stölzle. says, "He does not refer the happenings of his life to Divine Providence, nor to his own independent action, but to fate," exemplifying Schelling's saying that "nearly all great men of action or thought have been at bottom fatalists."

At a time when science, from horror at the extravagance of the reigning philosophical systems, utterly repudiated all alliance with metaphysics, Baer, who had his roots in the philosophical heyday of German thought, was a philosopher with his mind constantly bent upon the universal and monistic trend of existence. He distinctly held the position, which is now a popular one with thinkers, that philosophy should be reared upon the solid foundation of special research. He was thoroughly conscious of the necessity of a systematic and unitary view of nature. He saw that there was a deep inward connexion to all things, and thus, despite its extravagant nonsense, apprehended the kernel of truth at the basis of the *Naturphilosophie*. The aim which it endeavored to realise was in his mind a legitimate aim, though the methods which it adopted were false and ridiculous; and so, while rejecting it, he gained much of value from it. He considered all sides of the phi-

losophical problem, but he was particularly engaged with the history of teleology which formed the backbone of his philosophical thought. And on this cardinal doctrine, which is of the utmost importance in philosophy and science, we must dwell at some length.

The attitude of thinkers in Baer's day towards this fundamental question was, as he conceived it, either one of slavish adherence to a totally anthropomorphic teleology or of absolute repudiation of any purpose whatever in nature. Baer repudiates the first conception no less than the second. Wherever he looks he sees finality in the world, and would hence eliminate all obscurity from the question by proposing a new terminology. He believes that most of the attacks on teleology have their ground in improperly defined terms. He objects to the use of the word "purpose" (*Zweck*), maintaining that it has an anthropomorphic connotation, that it involves the notion of voluntary conscious action and is so absolutely inapplicable to nature. We cannot say of the processes of nature, he contends, that they have a purpose. It is not the purpose of the chicken-egg to become a chicken, because there is neither consciousness nor will in the egg, nor is it the purpose of the lungs to carry off the carbon in the blood and to introduce oxygen therein, etc. Where there is no will, there can be no purpose. Baer is driven, accordingly, to seek some other word for the expression *Zweckmässigkeit* (adaptation to purposes) then in use, and after attempting the words *Zieligkeit*, *Zielmässigkeit*, *zielmässig*, he ultimately hits upon the terms *Ziel*, *Zielstrebigkeit*, *zielstrebig*, as utterly bereft of anthropomorphic connotation and as expressing the exact gist of the question. These words, which are now so common in German philosophical and scientific literature, were then quite new in the German language and were formed upon the analogy of the older terms *Zweck*, *zweckmässig* and *Zweckmässigkeit*. *Ziel* means "end, goal, or aim"; *Zielstrebigkeit* means "tendency to aims or ends," it is finality of movement or development, and by Baer's own conception of it is perhaps best explained by identifying it with the *entelechy* of Aristotle, or the principle that things bear within them the end and aim of their development. Baer reached in fact by independent reflexion and observation on the developmental history of animals the very same results at which Aristotle arrived. "The goal or aim here indicated," he says, "is the termination of the movement considered, and does not exclude in the slightest the necessity or compulsion involved; it is, in fact, by very virtue of that necessity, all the more thoroughly secured. . . . An arrow shot from a bow, assuming that all the conditions involved have been accurately determined, proceeds with absolute necessity towards its goal without any inkling of purpose." Any event of which the result is previously determined, is, according to Baer, *zielstrebig*, that is, has a tendency to a definite end.

The doctrine of finality in nature, or of adaptation to definite manifest ends, runs like a red thread through all of Baer's investigations. It finds its particular application, however, as opposed to the teleophobia of the Darwinists. Darwinism had been held in Germany as giving the final quietus to the reign of teleology in

animate nature, and such great inquirers as Helmholtz, Sachs, and Dubois-Reymond were all agreed that the supposed finality of the organic world was not the result of conscious purpose but of necessity. To this Baer objected: "If you assume necessities without aims, your necessities are unconnected with one another, and their results can only be accidents." This leads him to a discussion of the nature of accident or chance. The striking of the bull's eye of a target by a stone which has been struck by the hoof of a passing horse is not chance, but the necessary mechanical consequence of the stroke of the horse's hoof. But it was chance that the stone, of which the target was *not* the aim, did just happen to strike the bull's eye of that target. Chance, therefore, exists, and Baer concludes: "The person who tries to explain adaptation by necessity alone, without tendency to ends, accepts chance, that is, something absurd, as his explanatory principle.' Chance heaped on chance a billion-fold is necessary to have produced the animate world by Darwin's theory; and that, surely, is impossible. His whole objection, in fact, resolves itself into the contention that necessity implies finality and that finality can be attained only by necessity. Necessity without finality is a contradiction and irrational.

Baer's criticism of Darwinism has perhaps not yet been appreciated, and it is doubtless true that many of the Post-Darwinian controversies which have grown out of the lacunæ in Darwin's system, were correctly foreshadowed by Baer. It could hardly be expected that a man of Baer's power and age, and with his great achievements in embryology and the theory of descent, could have taken the fresh and plastic attitude towards Darwin's views which the younger investigators of his own age took. We have only to remember here the attitude of Huygens with regard to Newton's theory of gravitation, and also the inability of Euler to grasp in its full scope Lagrange's conception of variations, although Euler had laid through many years of research the very foundations of this department of mathematics. Baer's criticisms may carry weight, but they may also have their explanation. Neither Darwin nor Baer is the less great for either having been opposed in opinion to the other. It suits with the purpose of the author of this work to reject Darwinism and in fact all theories of evolution that militate against the orthodox Christian view. It is explainable, therefore, that he adopts eagerly the utterances of some minor German naturalists who have recently pooh-poohed the theory of Darwin as something antiquated and definitively refuted. Our age bears in every department of research the signature of Darwin's thought, and it is not for pygmy epigones to belittle his significance. Truly, as Goethe saith in a profoundly ethical verse:

> "Ein jeder Wallfisch hat seine Laus,
> Kann auch die seine haben."

Weismann has recently referred to these very utterances, and pricked the bubble of their pretentiousness.

It is beyond our limits to touch on Baer's valuable and revolutionary ideas in

biology and anthropology. The author of the present work has devoted the best part of this volume to the discussion of their philosophical upshot. He also has much to say upon Baer's ethical, pedagogical, and political views, and upon his philosophy of history. It remains for us to mention briefly his religious opinions

Baer was a deeply religious and ethical personality. His teleology and wide knowledge of nature inevitably led him to a pantheistic conception which in his later years, it would seem, verged on theism. In the eighty-fourth year of his life, a few weeks before his death, he read a work by J. H. Fichte which, according to Professor Stölzle, converted him entirely to the belief in a personal God, which formerly he had expressly and strenuously denied. The grounds for the author's conclusion are, to say the least, weak. Baer was eighty-four years of age and dying when he was visited by a pastor to whom he said: "I have read Fichte's book and now believe what I have never believed before, that a monistic view of the world is not fully satisfied by the pantheistic conception." Later, on his deathbed, having asked the same pastor whether Fichte's book had interested the latter, who replied: "Yes, because it espouses the cause of the personal and living God," he answered: "Yes, the cause of the personal and living God who has predetermined all things." These were almost his last words. But they are not sufficient to make out a case of deathbed-conversion, for the evidence can be variously explained. To the author who has written this book for a definite purpose, they can be explained only in one way.

Professor Stölzle's volume is a portly one and shows painstaking research. It might have been less portly in our opinion and have contained fewer repetitions but it gives much of Baer, and all that it gives of the great inquirer's mind is intrinsically valuable and suggestive. T. J. McC.

GERBERT: UN PAPE PHILOSOPHE D'APRÈS L'HISTOIRE ET D'APRÈS LA LÉGENDE. By *F. Picavet*. Paris: Ernest Leroux. 1897. Pages, 227.

While the World's Parliament of Religions and its executive successor the Religious Parliament Extension have been long and faithfully laboring to carry home to the popular and clerical mind the necessity of the study of comparative religion, and great progress in academic circles in our country has been made in this direction, such an idea has found practical scientific realisation in a school of long-standing at Paris—the *Ecole des Hautes Etudes*. In this informal institution, which is devoted to research in its most advanced forms, there has existed for ten years a *Section of Religious Sciences* which offers opportunities for instruction that should satisfy the most exacting. And that its opportunities have not been neglected is evidenced by its attendance, which shows a total of 371, of whom 123 are foreigners.

The programme includes twelve seminary courses, exclusive of the optionals: (1) The Religions of the Uncivilised Peoples, by M. Marillier; (2) The Religions of the Farthermost Orient and of Indian America (China, Central America, etc.),

by M. Léon de Rosny; (3) The Religions of India, by M. Foucher; (4) The Religions of Egypt, by M. Amélineau; (5) Religions of Israel and the Occidental Semites, by M. Vernes; (6) Talmudic and Rabbinic Judaism, by M. Lévi; (7) Islam and the Religions of Arabia, by M. Derenbourg; (8) Religions of Greece and Rome, by M. Berthelot; (9) Christian Literature, by MM. Sabatier and De Faye; (10) History of Dogma, by MM. A. Réville and F. Picavet; (11) History of the Christian Church, by M. J. Réville; (12) History of Canon Law, by M. Esmein.

The school took its origin eleven years ago on the occasion of the abolition in France of the Catholic Faculties, and was the intellectual offspring of M. Liard, the Director of Higher Education. Its object is not propaganda, controversy, nor the arraignment of religions, but scientific inquiry exempt from theological passions; although as its founder well observes, if it is possible for impassioned controversies to arise in biological science we may be lenient with the zealous espousal of beliefs in religion which lies so much nearer our emotions. Still, contends he, it is possible to unite under the aegis of science the religious phenomena of the world; and that it is possible, the existence and flourishing condition of the school is proof.

Supplementing the work of the school are published important monographs by the professors and graduate scholars. Among these and constituting the ninth volume of the Series is the concise but exhaustive work on Gerbert, or Pope Sylvester II., by M. Picavet, *maître des conférences* for the history of dogma, an indefatigable student of medieval thought, whose publications we have had occasion to mention before.

The book *Gerbert* gives an altogether different picture of the Middle Ages than we are wont to take. Dark and despairing as these times were there were yet indications of slow progress, and *élite* minds who stood out as veritable saviours of the meagre civilisation that had survived the ruin of Rome. One of these last was Gerbert, monk, scholar, teacher, orator, philosopher, mathematician, pope, heretic Faust and Devil in one. Legend has woven about him a mighty and mysterious halo; but at the bottom are historical facts that make him the most striking figure of his century. He was a humanist, according to M. Picavet, surpassing the most eminent representatives of the Renaissance. Such was his political influence that it was said he made and unmade kings. From his researches in mathematics, D'Alembert said that had he lived in antiquity, he might have been the equal of Archimedes; or if later, says Picavet, perhaps the peer of Galileo. The invention of the Arabian numbers has been attributed to him; (he did in fact use empty spaces and columns for zeros;) while his reforms and great knowledge led to the belief of his irreligiousness and of his being in league with the Arch fiend himself.

M. Picavet has drawn well the leading features of the civilisation and thought of the tenth century. His work is not fragmentary and isolated, but shows the organic connexion of his subject with its historical past and its living environment. As for Gerbert, so M. Picavet has done the same work for Roscelinus, though on a

much smaller scale (the pamphlet, 26 pages, is in the same series, but published at the *Imprimerie Nationale*). Students of scholasticism should not fail to consult M. Picavet's brief and elegant studies. T. J. McC.

GENESIS OF THE SOCIAL CONSCIENCE. The Relation Between the Establishment of Christianity in Europe and the Social Question. By *H. S. Nash*, Professor in the Episcopal Theological School at Cambridge. New York: The Macmillan Company. Pages, viii–309. Price, $1.50.

This work may be characterised as a history of the development of the "individual," as seen in the changes undergone by the State, a kind of "pilgrim's progress," in which the soul aroused into activity by Christianity seeks and finally reaches the goal of her wanderings, the right of citizenship. It is not a story of any particular soul, and therefore it may be better to say, that the book is a prose epic on the rise and progress of the "common man." By this phrase is meant the elemental man who forms the material with which society is constructed, but who before the appearance of Christianity was so entirely subordinate to the State as not to have any "individuality." The theme which Professor Nash discusses is not new, but he has given it a new aspect by his philosophic treatment of the subject. He shows that, although the true worth of man as such had come to be recognised by the philosophers of Greece and Rome, it was not until God came to be conceived as "an Infinite Missionary Force in the service of the lowly "that the idea acquired much influence. The unity of God involves the moral unity of all classes of men, and hence "the idea of God becomes both the ideal and the task of mankind." The first six chapters of the work are devoted to the operation of Christian teaching in relation to the definition of man as "soul," and new light is thrown on the value of monastic life in connexion with the growth of that idea in its relation to social development. Monastic life was regarded as a return to a life of nature. It had its vows of poverty, and yet the dignity of hand-labor, which the ancients regarded as disgraceful, was insisted on. Moreover, the monastic system was based on the very ideas of freedom, equality, and fraternity which finally proclaimed themselves through Rousseau, and shook the world during the great French Revolution. These ideas bred of Christianity and nurtured in the monasteries had to make their way in the outside world, and Dr. Nash traces their progress, in combination with the idea of Duty, which is made explicit only through Christian teaching in relation to the Fall, until the "reformer's conscience" was developed. The eighteeth century was the "proving-ground" of the great conceptions which had so slowly grown. During this period the soul "entered the State," which now "receives its title direct from God and the sunshine," and which must work with the Church for the still further spread of the principle of "individuality." Dr. Nash writes "to be downright individual is to have a sturdy conviction that the potential is vastly greater than the actual; and this is the working conception of the infinite." It may be said to form also a key to his own work, as

with him individuality is at bottom merely the expression of the infinite. The book is a good addition to the literature of Christian socialism, and as a history of the gradual assertion of human *personality* it is of general interest. C. S. W.

L'Année Psychologique. Publiée par M. *Alfred Binet*. Avec la collaboration de MM. *H. Beaunis*, *Th. Ribot*, etc. Troisième Année. Paris: C. Reinwald. 1897.

The third issue of the *Année* opens with a brief article by Ribot on the "Abstraction of the Emotions," wherein this distinguished psychologist seeks to show that we analyse our emotional impressions and place certain representative features of them in relief, just as we do our sensory and intellectual impressions. A. Binet and J. Courtier contribute four exhaustive original researches in experimental psychology. N. Vaschide, V. Henri, and C. Henri are the other main original contributors. The department which epitomises and reviews the whole psychological work of the year 1896 is divided into sixteen parts, viz.: Histology, anatomy etc. of the nervous system, visual, auditive, tactual, gustatory, and olfactory sensations, memory and association, attention, perception and reasoning, illusion and hallucination, emotions, movements, language, individual psychology, dreams, etc., automatism, animal psychology, instruments, general treatises, etc. This department is complete and exhaustive, making the volume an indispensable reference-book of the year's doings in psychology. The indexes are full. In the bibliography 2234 titles are catalogued.

Allgemeine Physiologie. Ein Grundriss der Lehre vom Leben. Von *Max Verworn*, Dr. med. et phil., a. o. Professor der Physiologie an der medicinischen Facultät der Universität Jena. Zweite neu bearbeitete Auflage. Mit 285 Abbildungen. Jena: Verlag von Gustav Fischer. 1897. Price, 15 M.

In the preface to this excellent hand-book Dr. Verworn expresses his profound gratification at the favorable reception which the first edition met with, and has sought to retain the good will of the public by many new additions destined to keep his work abreast of the time, many new figures and considerable pruning of his old expositions. The work, which was originally a portly one in octavo, has been increased by some twenty odd pages, and it is especially noteworthy that the interest in its discussions has extended from the field of natural inquirers into that of students of medicine. The leading idea of Dr. Verworn's work is that the substratum of all elementary phenomena of life is the cell, and that hence in seeking an explanation of the phenomena of life physiology must explain the cell. General physiology, he says, can only be cellular physiology; the cell is the point to which all physiological researches have led and at which they have stopped; in it the secret of life is to be found. The book affords an exhaustive review of the elementary forms of life, and the elementary processes of life generally, and is profusely illustrated with diagrams, cuts of instruments, and drawings of the lower organisms.

THE ETHICS OF JOHN STUART MILL. Edited with Introductory Essays by *Charles Douglas, M. A., D. Sc.* Lecturer and Assistant in Moral Philosophy in the University of Edinburgh. Edinburgh and London: William Blackwood and Sons. 1897. Pages, cxxvi and 233. Price, 6 shillings net.

The reception accorded to Dr. Douglas's former work on the philosophy of John Stuart Mill offers a sufficient justification, were this needed, for the publication of the present volume, which deals particularly with Mr. Mill's ethical system. This forms so great an advance on the crude utilitarianism of Bentham, that its study is of great importance to those who would understand the bearings of modern hedonism. Dr. Douglas's present work is admirably adapted for the purposes of such study, for it not only reproduces from Mill's writings all that is required to obtain a perfect knowledge of his views, with an introductory Analysis to enable the reader to see clearly their most salient features, but it shows the influences which affected the development of Mill's ideas and points out where they are insufficient. The work is divided into two parts, the latter of which consists of Mill's "Utilitarianism," preceded by the chapters from his "System of Logic" in which that conception is developed, and the former of three Introductory Essays, followed by the Analysis. These Introductory Essays will naturally attract the most attention as giving the author's own opinions on Mill's system. They treat of "Ethics and Induction," "Ethics and Psychology," and "Ethics and Morality."

In the first named of these essays Dr. Douglas traces to its sources Mill's idea of an inductive science of character, which with him formed an important feature of political economy, as being the necessary basis of social science. Mill regarded society from the individual standpoint, instead of considering the individual from the point of view of society, as is now more usually accepted as the proper course. Hence a knowledge of individuals is essential, and it is not surprising that Mill was profoundly influenced by Hartley's Associationism and his related doctrine of Vibrations; although he was not prepared to accept the application of physiological principles for the explanation of mental states unless he was convinced that psychological analysis was not adequate to furnish it. Dr. Douglas does well to refer to Mill's dissatisfaction with the term "necessity" in relation to human conduct, which he rightly treated as simple determination by antecedents, volition not being otherwise bound.

In his second essay, Dr. Douglas deals with Mill's theory of morality, which he regards as marred by its dependence on a psychological conception of conduct. Ethology, the science of character, is treated by Mill as a branch or application of psychology, a view which renders such a result inevitable. As thus limited, no account can be taken of the internal or organic unity which constitutes the self, seeing that psychology is restricted to inference from the observed facts of mental life. Mill was aware, as Dr. Douglas points out, of the incompleteness of his account of mind, recognising that "the organic unity and continuity which characterise experience, and without which there would not be knowledge, depend upon the relation

of experience to a single knowing subject which is not a mere series of conscious states." And yet his psychological method prevented him from giving a proper basis to his system of ethics, and rendered his theory of volition incomplete. It does not allow sufficient account to be taken either of the unconscious factor which, as the expression of heredity, must largely affect the conduct, or of the personal life which exhibits itself in voluntary actions.

The ultimate problem of ethics is the discovery of the principle by which the moral judgment is determined, and Dr. Douglas in his essay on "Ethics and Morality" considers how far Mill was successful in dealing with it. By his assertion that pleasures vary in quality as well as in quantity, which is consistent with the higher position he assigns to virtue as a governing principle of human conduct, he provided a means of transforming earlier utilitarianism, the basis of which is changed when it is affirmed that the wise and the good know what *ought* to be liked. We are told that Mill's criticism of Bentham, which is given in the Appendix to the present volume, took its special form under the influence of Coleridge and Wordsworth and, at second hand, of German Idealism. While accepting Bentham's method, Mill rejected many of his opinions, his estimate of which may be formed from his statement, that "every human action has three aspects: its *moral* aspect, or that of its *right* and *wrong*; its *æsthetic* aspect, or that of its *beauty*; its *sympathetic* aspect, or that of its *lovableness*. The first addresses itself to our reason and conscience; the second to our imagination; the third to our human fellow-feeling. . . . Sentimentality consists in setting the last two of the three above the first; the error of moralists in general, and of Bentham, is to sink the two latter entirely." Surely Mill was not far from the truth; but he erred in viewing human action from too limited a standpoint. Conduct is right, beautiful and lovable, when it is in accordance with the principles of truth. Hence Mill's three aspects are merely different aspects of the true, and as truth is cosmical its sanctions must not be sought for merely in man himself. Nature works through man for the establishment of the principles of truth, which are eternal and are as consistent with human suffering as with human happiness. The aim of Nature is perfection in her works, and although on the broadest survey of her operations the greatest happiness of the greatest number will be found to prevail, yet at the furthest this can never be more than a *criterion* of conduct, the vital principle of which must always be truth. C. S. W.

THE MYTHS OF ISRAEL. The Ancient Book of Genesis with Analysis and Explanation of Its Composition. By *Amos Kidder Fiske*. New York: The Macmillan Company. 1897. Pages, x, 355. Price, $1.50.

Although the author of *The Myths of Israel* does not make claim to originality of investigation into the sources of what is usually termed Old Testament "history," he has done that without which originality in these days of criticism is of little value. He has studied the work of others in the same field for the purpose

of instruction, and then he has made an independent study of the subject by the light thus gained. In his previous work, *The Jewish Scriptures*, the author set forth his views of the Old Testament as a whole, and in the present one he applies them to its first book, that of Genesis, which is analysed and critically examined so that the manner of its production may be demonstrated. Mr. Fiske considers as established beyond dispute, that the first six books of the Jewish Scriptures were put into their present form after the return from the exile in Babylon, when the Levitical system of the second temple was developed, and that the greater part of matter of "Genesis" was taken from a Sacred History of the people compiled in the time of Hezekiah, near the end of the eighth century before Christ, from two older versions, of which one was composed in the Northern Kingdom and the other, half a century or more sooner, at Jerusalem. The first of these older versions, from which was derived much of the Book of Genesis, is that usually known as the Jehovistic narrative, from the use of the name Jehovah for the deity. The other version takes its title of the "Elohistic document" from its application to the deity of the word "Elohim" in the narrative, down to the revelation to Moses of the name Jehovah. When the two versions were blended the Judean scribe took the Elohistic narrative as the basis of his compilation, piecing into it passages from the other document, and occasionally introducing material from some other source. No better evidence of compilation need be required than the reference of the same incident—the beauty of the Hebrew woman attracting the attention of Abimelech, king of Gerar—to Sarah the wife of Abraham and long afterwards to Rebekah, the wife of Isaac. If the suggestion be well founded, that the story of Judah and his daughter-in-law Tamar was intended as a satire on the family of David, we have proof of the late origin of an important part of the present narrative, as well as evidence of the spirit which influenced the compiler. The author of *The Myths of Israel* may be congratulated not only on having written a very interesting book, but for the arrangment of his material, which is divided into parts, each division being preceded by a critical examination of its subject matter. The last chapter is entitled "The Unknown Homer of the Hebrews," that is, the Jehovist, whom the author supposes to have been a personality veiled behind the names of Elijah and Elisha, and is reprinted from *The New World*. C. S. W.

ANNOUNCEMENT.

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THE MONIST.

THE ARYANS AND THE ANCIENT ITALIANS.

A PAGE OF PRIMITIVE HISTORY.[1]

THE ethnographical problem concerning the Aryan-speaking peoples seems to be solved, because there is a certain acquiescence in the opinion, advanced as early as the beginning of this century, that the Aryans before they settled where they have been historically found were divided into as many ethnical groups as there are peoples with national characteristics, like, for instance, the Italians and the Hellenes. It is true that Latham, Benfey Geiger, Pösche, and Penka have attempted to find a different solution of the problem. But the majority of archæologists and philologists have not been shaken from the old opinion, and have even interpreted by the assistance of the old hypothesis the facts recently brought to light. To me, however, it seems that the Aryan problem is not yet solved; and in spite of the labors of Italian archæologists that part of the question which relates to prehistoric Italy is still very obscure.

It is for this reason that I wish to present the results which I have reached by means of anthropological studies upon ancient Italy, and by means of a comparison between Italy and the other regions of Europe, in the hope that in the new form in which I

[1] Translated from the manuscript of Professor Sergi by I. W. Howerth, of the University of Chicago.

study the Aryan problem in Italy I may be able to throw some light upon the Aryan problem in Europe.

I.

From archæological discoveries at Villanova in the Province of Bologna, down to those at Tarquinia Corneto, at Vetulonia, and at Albalonga in Latium, there has been a question concerning the people or peoples of the first age of iron who left burying grounds with tombs for cremation, as to whether they were Etruscans or Umbrians, or Umbro-Latins. And from this has arisen the great contention concerning Etruscan and Italian origins, commonly so called, and the division between the archæologists of Bologna who affirm with Professor Brizio that the Etruscans were an Oriental people who came by sea, and that the Umbrians were Aryan Italians, and the archæologists of Rome who affirm with Helbig and Pigorini that the Etruscans were an Italian branch which came from the North and stopped in the valley of the Po before establishing themselves in Etruria.

The problem is this: Are the Umbrians Italians? Are the Italians Aryans? These two questions may be reduced to one: Who were the Italians?

The Italian origin of the peoples of Italy has been established by two very important characteristics,—language and civilisation. The latter is determined by archæological data from the bronze epoch and from the first appearance of iron. The physical characteristics of the population have not been taken account of, because philologists and archæologists in general look upon them as useless and as little susceptible of results.

The Aryan origin of the Italians has also been determined by means of the same two characteristics, linguistic and archæological. Archæologists and philologists have unanimously declared that the Italians are Aryans like the Celts, the Germans, the Slavs, and the Indians. If they had limited themselves to affirming the Aryan origin of the language and civilisation without touching ethnology, they would have been able, perhaps for the most part, to sustain the thesis. But instead of that they have passed into ethnology

without examining the physical characteristics of these Aryan-speaking Italians, and have solemnly affirmed the physical unity of the two races.

It is well known that in the enthusiasm of the first linguistic discoveries which established the unity of origin of the Aryan languages, the physical unity of the peoples speaking the Aryan language was erroneously affirmed. But it is equally well known that the most superficial analysis of the physical characteristics of all these peoples has shown that they belong to different human varieties. To-day the question is to find out who among the different ethnical groups which speak languages of Aryan origin were Aryan, and who among them have assimilated the Aryan language and civilisation or had it imposed upon them.

In Germany especially this question has been warmly discussed. Virchow, although he has been for a long time attempting to solve the problem, has never succeeded. He cannot persuade himself of the fact that the majority of the German-speaking population who settled in the south and central Germany is different in its physical type, especially in its cranial features, from those who are generally looked upon as thoroughly Germanic, and who are found further north, but always in the minority in respect to the great mass of Germans of the brachycephalic type.[1]

The difficulty of the solution of the question in regard to two Germanic types is derived above all from the belief that all those who speak German are legitimate Aryans, and from the conviction that the true primitive Germanic type was that of the so-called *Reihengräber*, which is in the minority in respect to the other type which predominates and which is brachycephalic and dark.

I hint at the difficulties of the Germanic problem, because they are not very different from those of the Italian problem. The solution of neither the one nor the other can be found, I believe, without the combination of archæological and linguistic results with anthropological, and without their convergence, when, how-

[1] See Virchow, *Rassenbildung und Erblichkeit*. Festschrift für Bastian. Berlin, 1896.

ever, the latter may not be obtained by rational, or rather natural, methods.

Meanwhile it is useless to show how, in the matter of determining the Italian origin of the primitive inhabitants of Italy, there is no agreement between the linguistic and archæological results. For, while a language with Aryan characteristics divided into many dialects, at least in a few ethnical groups, is found from Umbria to the extremity of the peninsula, the civilisations are diverse, especially in some marked characteristics to which are given an Aryan signification.

According to Brizio the Umbrians should be the Italians *par excellence*, not only on account of the complexity of archæological facts which unite them to the other peoples called Aryan, but also on account of their peculiar funeral custom with its characteristic feature, that is, the cremation of bodies, as it is found in the first age of iron from Bologna to the mouths of the Tiber in all that territory which formed prehistoric Umbria in its most flourishing period, from the Adriatic to the Mediterranean, as is indicated by Herodotus, and as was eventually demonstrated by the archæological discoveries at Villanova, at Certosa of Bologna, at Tarquinia Corneto, at Vetulonia, at Albalonga, and in the district of Rimini.

On the other hand, according to Pigorini, the Italians must have occupied a greater territory, because they extended beyond the region named into the valley of the Po where has been discovered the Terramare, dwellings built on piles driven into the ground. Wherever Pigorini finds archæological objects of the form and character common to the Aryans, and cremation as a funeral rite, he sees Italian-Aryans. And his theory, which is substantially identical with that of Helbig, is very well known.

The Italians, so Pigorini and Helbig maintain, came from the North, occupied the valley of the Po, constructed pile dwellings with some features which recall the four-sided city of primitive Rome. For unknown reasons, before the first age of iron they abandoned them, crossed the Apennines and came into the territory which later became Etruria and founded there the Etruscan cities. Then they pushed into Latium and founded Rome. Hence the

Etruscans and Latins were Aryan Italians, formerly inhabiting the pile dwellings in the region of the Po, to-day brought to light in the Terramare, which contains the remains of dwellings and domestic utensils. Therefore Pigorini believes that these Aryan peoples may have pushed on even to the Ionian Sea.

Apart from the divergence between these two renowned archæologists in the interpretation of the Terramare, in which Brizio thinks he has found the ancient Ligurian Italian stock, both the one and the other find Italian-Aryans wherever they discover the funeral ceremony of cremation associated with bronze, with characteristics common to other European peoples also called Aryans, and both these renowned archæologists accept the supposition that before the Italians emigrated into Italy and the Hellenes into Greece they constituted a single ethnical group, the Greco-Italic, which divided after a time in the Balkan Peninsula.

But not all archæological data of Terramare in the valley of the Po and of Umbria correspond to those of other Italian populations speaking Italian languages of the Aryan type. Cremation as a funeral rite did not exist outside of ancient Umbria and the little territory where Rome was founded. The tombs of Piceno, for example, at Novilara near Pesaro, and those farther south at Alfedena (ancient Aufidena), and others, clearly demonstrate this. How is it that Italians did not all have one funeral rite? Why is there not found the same convergence of archæological facts, so fundamental, as in the linguistic? In other words, proof of the Aryan origin of the Italians has a greater extension in language than in archæology, and in general in civilisation also, if not wholly, at least in part. Archæologists know this very well. Perhaps it will be said that those ethnical groups which are comprehended in the common term, Sabellians, are not Italians. Then the number of Italians, with their territory, would be reduced to less than half the populations which have occupied Italy and which speak the Italian language, which would be absurd.

All this difficulty, all these doubts have not yet been settled by archæology and linguistics, studies which have not been associated with physical anthropology. The latter, it appears to me, by ex-

amining the physical characteristics of the different ethnical groups which are found in Italy may be able to show whether the Italians are Aryans or whether they belong to another human stock different from the Aryans. And as the Umbrians were a people who from archæological discoveries and from linguistic relation appear to have been a branch of the Aryan stock, it is from them that we may be able to gain some useful anthropological knowledge which may prove to be the key to the solution of the Aryan problem in general.

II.

Granted that the Umbrians of Bologna, as of all the Umbrian territory at the time of the first age of iron, burnt their dead, as is shown by the great burying-grounds with charred remains, it would seem that we can never know their osteological characters. But it is known that the Etruscan invasion restored the practice of inhumation in all the Umbrian region, in Western Etruria as well as beyond the Apennines in Felsinean territory. The numerous tombs of the old Certosa of Bologna are an evident demonstration of this; and Nicolucci, Calori, and myself have had many skeletons from those tombs to examine.

The same is true of Western Etruria, in which many skulls have been exhumed and studied, by Nicolucci, Zanetti, Calori, and myself in Italy. Other series of Etruscan skulls are found in many of the museums of Europe. It may be affirmed therefore that the number of skeletons exhumed from the Etruscan tombs, from the whole territory or from that part of it dominated by that people, has been sufficient to give a knowledge of the osteological features of the inhabitants, who had a civilisation of bronze and later of the first age of iron, and the funeral ceremony of cremation.

Now it may be objected that the skulls of which I speak are not Umbrian. I reply at once that they are both Umbrian and Etruscan, because they must belong to the Umbrian population which was conquered by the Etruscan, and to the Etruscan population which conquered. Further on my reply to this objection will be more complete.

I maintain that the Etruscans were a colony of the Eastern Mediterranean with a civilisation which had undergone Asiatic influences, and that they settled upon the shore of the Mediterranean in Umbrian territory, where they became strong and powerful on land and sea, and in consequence had gone to the Apennines and invaded the stronghold, I might say the capital of Umbria, Felsina, where they established new settlements and then extended themselves beyond the valley of the Po, subjecting those populations. Brizio has clearly demonstrated these facts, and I have only to refer the reader to his works.[1]

A colony, however large it may be, is necessarily limited in the number of its components. The Etruscan colony must have been composed of some thousands of people. Hence it is easy to suppose, that that colony increased little by little by the fusing of its population with the inhabitants of the occupied territory, who must have been numerous from what is known of the flourishing condition of the Umbrian rule. And it is also easy to think, and admit, that when they made military expeditions and conquests their army was in great part composed of the primitive inhabitants of the conquered territory, that is, of Umbrians.

Now there must have been a time in which no difference could be detected between the colonists, the masses of the people, at least, with their descendents, and the ancient Umbrian inhabitants. Etruria in its more flourishing period, had, from one end to the other, uniform civilisation and customs. The funeral rite of cremation gradually disappeared and was substituted for that of inhumation; even the name Umbrian was lost forever from the western region, and that of Etruria was substituted for it. But the people did not disappear. They were naturally fused with the Etruscans. Without the archæological discoveries of to-day we could not know that Etruria was Umbria. But Brizio shows, by means of the gradual transformation of funeral customs and of the arts, the persistence of the Umbrian people under the Etruscan

[1] Brizio, *La provenienza degli Etruschi, Atti e Memorie di Storia Patria per le Romagne.* Bologna, 1895. *Id. Monumenti archeologici della provincia di Bologna.* 1881.

rule.[1] Nor can it be otherwise, unless one wishes to admit the absurdity that a limited colonisation causes a numerous and dense population entirely to disappear.

If, therefore, all the Umbrians and Etrurians, of whatever origin, practised inhumation, the burying grounds which are called Etruscan ought to contain skulls of Umbrians and Etruscans together.

When Felsina also through the Etruscan invasion became Etruscan, and with Felsina its territory, the dead were inhumed in the Etruscan manner no matter to what nation they belonged. In fact in the period called Etruscan, tombs for cremation, characteristic of that period and of the preceding one, are not found at Certosa of Bologna. Here then the burying grounds ought to furnish us the osteological characteristics of the Felsinean Umbrians.

These considerations are sufficient to present the fact that from the Etruscan tombs of Etruria, and of the Province of Bologna, we may obtain certain knowledge of the physical characteristics of the Umbrians, as well as of the Etruscans, and that the Umbrians did not disappear nor have they disappeared even to-day notwithstanding historic changes.

Only one objection may be presented, and it is this: If in the Etruscan tombs Etruscans and Umbrians are found, how can we distinguish the one from the other? To this objection I shall give further on a satisfactory reply.

III.

Let us now pass to the examination of the human remains obtained from Etruscan and Felsinean tombs, and let us especially concern ourselves with cranial forms, which possess the most certain characteristics of human varieties as studied in their osteological characters.

With the old craniometric method, Nicolucci, Zanetti, Calori, and myself have found two cephalic types, elongated skulls corresponding to the dolichocephalic and mesocephalic craniums, and

[1] *Op. cit.*

short skulls corresponding to the brachycephalic craniums, distributed as follows:[1]

CRANIUMS FROM ETRUSCAN TOMBS.

Nicolucci	Long Type 12	Short Type 6	Total 18
Zanetti	" " 13	" " 4	" 17
Calori	" " 8	" " 1	" 9
Sergi	" " 7	" " 3	" 10
	Dolichocephalic 40	Brachycephalic 14	Total 54

or seventy-four per cent. dolicho-mesocephalic; twenty-six per cent. brachycephalic.

FELSINEAN SKULLS, OR FROM THE SO-CALLED ETRUSCAN TOMBS OF BOLOGNA.

Calori	Dolicho-mesocephalic 11	Brachycephalic 5	Total 16
Sergi	" " 7	" 3	" 10
	Dolicho-mesocephalic 18	Brachycephalic 8	Total 26

or seventy per cent. dolicho-mesocephalic, or thirty per cent. brachycephalic. These figures show that the brachycephalic or short type is in the minority and oscillates between about twenty-six and thirty per cent. in Etruria and in Felsina, a little more than a fourth of the population, and that the long type of skulls oscillates between seventy and seventy-four per cent. But that tells us very little. In order to have a more concrete idea of the differences between the two types it is necessary to examine the cephalic forms according to the natural method, that is the shapes, and then we will be able to compare them with others that are found in other Italian and European populations.

As I have shown in a series of works, dolichocephalic and mesocephalic skulls include the cranial varieties denominated by their forms, ellipsoidal, ovoidal, pentagonal, and some other accessory forms. On the other hand, the brachycephalic correspond to the sphenoidal or large cuneiform, to the platycephalic, divided into several subforms, and to the spheroidal.

The Umbro-Etruscan population of Etruria and Felsina was composed, then, of two ethnical elements quite distinct and well

[1] To speak only of the studies published. The series of Etruscan skulls are very numerous.

determined, that is, of a type with skulls having an ellipsoidal, ovoidal, and pentagonal form, and which was in the majority; and of a type with platycephalic, sphenoidal, spheroidal skulls, which was in the minority.

This has been found to be the fact in the territory where Rome now stands. I have had the good fortune to examine twenty-nine skulls which belonged to the period which has been determined by archæologists to be in part anterior to and in part contemporaneous with the walls of Servius Tellius, that is to say, with a time which goes back to the beginning of Rome.

Among these twenty-nine skulls I have found only four which may be said to be foreign to the majority of the element dominating in the population, that is, a square platycephalic, a pentagonal platycephalic, and two sphenoidal. The other forms belong to the category dominating among the Etruscan and Umbrian, that is the ellipsoidal, ovoidal, and pentagonal.[1]

To the anthropological observation may be added the archæological. Roman territory presents a fact almost identical with that of the Umbrian and Umbro-Etruscan territory, that is, there is found there, in an age anterior to the foundation of Rome, the funeral ceremony of cremation along with archæological objects identical with the Umbrian. But there is found contemporaneously also the custom of inhumation, that is to say, the custom there was a mixed one. This is a fact of great importance, because it indicates that the practice of cremation had not yet taken strong root in the entire population, as it had done in all Umbria.

We may admit, then, and with much certainty, that in Italian districts where is found the rite of cremation along with objects of the first age of iron, later, and in our case in the Umbro-Latin territory, the population having given up the custom, and turned to burying the dead, has shown itself to be composed of two different ethnical elements, distinguishable by means of the cephalic types, one of which was more largely represented than the other. In both

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[1] See Sergi, *Studi di antropologia laziale*. Rome, 1895.

of the territories examined the two types are respectively homogeneous and reveal two different stocks.

Let us pass now to other Italian territories where the custom of burning the dead is not found in the most ancient times, that is, from the first age of iron to the bronze period.

Of these territories it is sufficient to mention the two most interesting and conclusive, Novilara near Pesaro, and Alfedena in Samnium.

In Novilara among forty-five heads which I have examined, I have encountered no type which suggested that already seen in Etruria, in Felsina and in the Roman territory as the minor element of the mixed population,—no sphenoidal, platycephalic, or spheroidal forms. The forty-five skulls were on the contrary all of the elongated type, ellipsoidal, ovoidal, and pentagonal, forms peculiar to the ethnical element which prevailed in Etruria and in Umbria, as well as in the territory of Rome.

Brizio who splendidly illustrates the discoveries of Novilara finds inhumation with special characteristics, that is, with folded positions of the body. He attributes those tombs to the Ligurians, who are only a branch of the great Mediterranean stock.[1] I am inclined to the belief that they belonged to the Pelasgians who were another branch of the same stock, akin to the Ligurians, and that the primitive population of Italy, excepting some small part, were Pelasgo-Ligurians.[2]

The other burying ground is that of Alfedena, the ancient Aufidena, perhaps, on the Sangro, to the east of Latium. This burying-ground is conspicuous both on account of its extent and also on account of its showing a succession of epochs. Its history appears to extend from the eighth to the fourth century before Christ. No sign of the rite of cremation has been found there.[3] I have had a superb collection of thirty well-preserved skulls exhumed from that burying ground by Professor De Amicis. It seems as if I had chosen

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[1] Brizio, *Il sepolcreto di Novilara presso Pesaro.* Rome, 1895.

[2] Sergi, *Origine e diffusione della stirpe mediterranea.* Rome, 1895.

[3] Cf. *Notizie d'antichità e scavi.* Rome, 1895, 1897.

them myself in order to demonstrate my assumption. They all have the beautiful elongated forms, ellipsoidal, ovoidal, and pentagonal, like those of the type found among the Felsinean, Etruscan, and Roman skulls from the primitive age of the founding of Rome. There is not a single skull of the other type having a spheroidal or platycephalic form.

I could mention other burying grounds where the rite of cremation does not appear, and where the cranial forms found in them are of the same type as those of Novilara and of Alfedena. But I think the two mentioned, and studied by me directly, are sufficient to show that wherever in ancient times the custom of burning the dead did not penetrate, the type of population reveals only a single ethnical element; but, on the other hand, wherever that custom did penetrate there are found two ethnical elements with different characteristics, a fact which suggests that there must have been two human stocks intermingled.

IV.

After what has been said, the problem is this: To what stock do the dolicho-mesocephalic skulls with elliptical, pentagonal, and ovoidal forms belong, and to what other stock do the brachycephalic skulls with sphenoidal, spheroidal, and platycephalic forms belong?

Only a comparison with other populations of Europe can give the solution of this problem.

The brachycephalic forms above indicated are found among the Celts, Slavs, and the Southern Germans especially, while the others, or the dolichocephalic forms, are found among the populations of the Mediterranean, and hence among the majority of the inhabitants of Italy. Already the reader will have discovered for himself that if in the Italian burying grounds without ethnical mixture the type is one, and if in those with mixed type the dominant one is the same as in the first, the Italian must necessarily be the one which includes the elongated, pentagonal, ellipsoidal, and ovoidal forms, and the other must be a foreign type mingled with the former.

When could this second cephalic type, which suggests a people foreign to the Italians, have come in? Even here the reply is easy, and to obtain an indication of the time of their advent it will be sufficient to refer to the epoch of the Etruscan, Felsinean, and Roman burying grounds.

In order that the skulls of both stocks, the Italian and the foreign, should be mingled in the same Etruscan burying ground, it must be admitted that the ethnical elements which had these cranial characteristics inhabited that territory in an age anterior to the Etruscan occupation, that is, to the Umbrian rule, and this may go back to the tenth century, and even beyond the common era. The same thing may be said of the Felsinean and the Roman, because the two ethnical elements must have been fused without distinction or they would not have been buried indifferently in the same tombs. So, as before the Etruscan colonisation both formed one people, in the Etruscan rule they entered as elements of the Etruscan population.

We have still another proof that these ethnical elements foreign to the Italian stock entered in prehistoric times, and this proof is derived from the period of the burying grounds themselves in which these skulls were found. The Etruscan burying-grounds date from the seventh to the fifth century at least; those of Rome anterior to or contemporaneous with the Servian walls belong to the sixth century, and those of Certosa of Bologna to the fifth. That is, all are anterior to any historic invasion from the North, and therefore are earlier than the fourth century which is the epoch of the Gallic invasion. I have no need to show that the Etruscan burying-grounds of Bologna are anterior to the Gallic conquest, for Brizio among others has clearly demonstrated it.[1]

The Italians therefore from their ethnology belong to the Mediterranean stock. In a prehistoric epoch there was an invasion from the North and the Northwest which reached only a little beyond the banks of the Tiber. This invasion was made by a people which had the physical characteristics of the Celts, and the Slavs, and

[1] Brizio, *Monumenti archeologici, cit.*

the modern Southern Germans, and differed therefore in their physical characteristics from the Italians. I do not hesitate to call this stock ARYAN, and therefore to affirm that the foreign skulls found in the Etruscan, Felsinean, and Roman burying-grounds are Aryan. *The Italians, therefore, anthropologically considered are not Aryans. The Umbrians, however, are Italians mixed with Aryans, but chiefly Italian in the proportional number of the population.*

V.

If these are the facts which result from both archæological and anthropological researches, which are in full harmony, let us interpret them and reconstruct the history which is written only in the monuments and in the bones of the two different stocks; and of the latter the skulls especially, persisting in their forms, are the true mile-stones of the migrations of the people and of their relations.

The Mediterranean stock had invaded and occupied a great part of Europe, and Italy had already received among its first inhabitants two branches of the same stock, Ligurians and Pelasgians, while the Greeks had especially the Pelasgian. Other secondary ethnical elements were doubtless mixed with these two principal branches of the great stock, but in such a minority as not to be able to destroy the unity of origin. The Ligurians and the Pelasgians had common physical forms, and the differences being accessory it would be out of place to discuss them here. It appears that the whole peninsula including the valley of the Po was occupied by these first inhabitants who had a civilisation which was Mediterranean, the most developed part of which was oriental or Mycenean. According to Flinders Petrie, Mycenean civilisation was already flourishing sixteen hundred years before Christ.

Probably the northern region of Italy or the valley of the Po was less advanced, and Europe was in the neolithic or even the eneolithic age, the age of copper, as seems to be ascertained, when tribes of savage and barbarous people of a special physical type and furnished with arms of bronze, advanced from the East. They invaded Europe in various directions and drove away or conquered

the primitive inhabitants, according to the greater or less resistance met with.

The customs of these invaders were different from those of the first inhabitants. They burned their dead and preserved the charred bones in rude vases of earthenware. They were inferior in civilisation to eneolithic peoples who, with those of the preceding and therefore more ancient period issuing from the palæolithic were acquainted with writing, as is shown by the discoveries of Mas d'Azil,[1] by the sculptured stones of the dolmens and other monuments;[2] and they knew how to carve in wood, in bone, and in ivory with a skill which is wonderful for such a primitive age.[3] They had a very beautiful ceramics. Probably these migratory tribes came from central Asia, but before they moved toward middle and central Europe they perhaps stopped in the most eastern part of Europe, that is in Russia, and from there, in groups more or less numerous, pushed on toward the West. We cannot know how much time they spent in their movements; but it is certain that in the various groups which they formed, these people in an indeterminable epoch divided into many branches, constituting nations distinct in language, in customs and in other features, according to local and regional conditions.

The first groups, to consider their ancient and modern geographical position, must have been those who afterward historically preserved the name of Celts; the second, a little later than the first, were Germans, who frequently mingled with them. A third group, the last to arrive, was that which afterward took the name of Slavs and was very numerous. We may call these three branches of one human family, Proto-Slavs, Proto-Germans, and Proto-Celts, since in that prehistoric epoch they did not have the modern or historical names, but they were doubtless the ancestors of the three modern branches which bear these names.

The invasions of these numerous and strong peoples covered

[1] Cf. Piette, "Les Galets coloriés du Mas d'Azil." In *Anthropologie*, 1896.

[2] Letourneau, "Les signes alphabetiformes du dolmen des Marchand." *Bulletin société anthrop. de Paris*, 1893.

[3] Piette, "La station di Brassempouy." *Anthrop.* 1895.

an immense area in Europe. They invaded France, Great Britain, Germany, Switzerland, and other western and northern regions. They invaded Italy from the North, and all the Balkan region. Nor was the Iberian Peninsula spared. Any one who visits the prehistoric museums of Europe, those of Switzerland, Berlin, Prague, Vienna, and Trieste, and observes the archæological data discovered in the territory of the Celts, Germans, and Slavs, may obtain an idea of the civilisation of the stock called Aryan, which has a common fund of handiwork, together with the common custom of burning the dead, which shows a civilisation common in origin; but that this unity soon became a varied multiplicity on account of the regional and national developments of each people or part of a people.

The comparison of the civilisations above mentioned with that of the valley of the Po in Terramare and with that of Umbria show that both the first and the second are derived from a common Aryan, while in Umbria, the later development had another origin, as I shall show farther on. Hence I call this civilisation Aryan, as the archæologists also call it. But the manner of the introduction of this civilisation, and of the people who imported it, have not received a satisfactory interpretation, it seems to me, in the current opinion of philologists and archæologists. Anthropology with the archæological data may give a solution to this difficulty, and lighten up the obscurity which now reigns there.

The Aryans invaded Italy probably by two ways: by the central Alps and by the eastern Alps. From the North or through the central Alps came the Proto-Celts and occupied a great part of the valley of the Po down to Piedmont toward the West, and to the Province of Bologna toward the East, and occupied the pile dwellings, in whole or in part, especially those constructed upon the dry land known to-day by the name of Terramare. From the Northeast the Proto-Slavs who before this movement toward Italy had occupied a wide territory toward the East, and these took possession of the region about Venice, establishing themselves on the borders of the Proto-Celts to the West and South of the province of Bologna. The Proto-Celts came in the pure bronze age. In

Terramare iron is not found and the primitive bronze is of the archaic forms.

That the invaders were the ancestors of the Celts in the valley of the Po, which includes Lombardy, Piedmont, and Emilia, is shown by the archæological fact of the Aryan civilisation, and the type of population which occupies it and has occupied it from prehistoric times.

The same may be affirmed of the Venetians who were also Aryans and Proto-Slavs with osteological features identical for the most part with the Celts and their ancestors. Hence it may be affirmed that the Aryan invasion in the valley of the Po was almost complete and brought there the civilisation along with the population.

But if the Italians, that is the Mediterranean races, were expelled more or less completely from the regions about the Po down almost to the territory of Bologna, at this place the resistance and the struggle between the Italians and the Aryans must have been greater. But the victory was with the Aryans, as was early shown by archæological and anthropological discoveries. They overthrew the Italians and founded Felsina, to-day called Bologna, or made it their principal settlement. The victory, however, did not produce the same effect that we see in the region of the Po, that is, the almost complete expulsion of the ancient inhabitants. On the contrary there was an Aryan rule with a fusion of two peoples, because, from the anthropological data examined, it is found that the Italians remained in the majority in the Umbrian population.

From Felsina the Aryans pushed on to the Adriatic on the one side, and on the other they passed beyond the Apennines and conquered in the same manner the population down to the right of the Tiber, which marks the borders of the Umbrian rule, but they did not stop there. They passed beyond it and attempted to extend their dominion. They occupied a few places, and one of their settlements was at Albalonga. Here have been discovered the remains of their civilisation with the funeral rite of cremation.

The name Umbrian is probably not Italian. The people of that name were derived from a part of the Aryans who invaded the

territory and became dominant. But it is a fact worthy of consideration that their civilisation greatly developed, and was superior to that of any other contemporaneous Aryan people, if we except Este and later Watsch and Hallstatt where is found a civilisation which seems to be one with the Umbrian or an uninterrupted continuation of that at Felsina, at Hallstatt, and in the valley of the Danube down to Bosnia and Herzegovina.

MAP OF THE FIRST IRON-AGE—VILLANOVA-HALLSTATT.

If we recall the anthropological characteristics of the population which extended from the valley of the Danube toward the West in Carinzia, in Carniola down to Venice in Italy, we must admit that in origin they belong to the Proto-Slavs, or Illyrians according to the historical ethnical name. If we remember that the Venetians in the region of the Po, which they occupied, were a very ancient colony we must necessarily affirm that besides a Celtic

current in Italy there was one from another Aryan branch, that is the Slavic.

If then we think that the civilisation of Felsina, so rich, had continued more in the Slavic zone than in the Celtic, and that in spite of the relations with that of the Terramare both seem distinct and independent, we must still admit that the people of the Terramare remained stationary down to their conquest, first made by the Umbrian and then by the Etruscans. It is not possible to think, as Pigorini believes, that the people of the Terramare abandoned their territory and their settlements after they had settled there. Probably he is induced to make this supposition, which Helbig also makes, by the fact that he sees that these people made no progress while the Umbrians were at the height of their civilisation. The people of Terramare remained separated and isolated in the movement of Aryan and Mediterranean civilisation, when these met and resulted in the great development of the Umbrian civilisation. They then scattered, were lost in the obscurity of primitive history or overcome by more advanced populations down to the Gallic invasion.

There is no doubt that the great evolution of the Umbrian civilisation and of that beyond the borders of Umbria, at Este, at Watsch, and at Hallstatt, was due to the influx of the Mediterranean civilisation. Without these Italy with the rest of Europe would have remained in barbarism. Because, as it is easy to show, the neolithic, and even the eneolithic civilisation of Europe, was much superior to that imported by the Aryans. This is shown by the use of writing known in Europe before the neolithic age, and by the very fine ceramics, and by the art of carving in ivory, in bone, and in wood.[1]

The Aryans on the contrary plunged the people of Europe, and even those of the peninsulas of the Mediterranean, into the darkest barbarism, and they would have remained there if the new currents from the East of the Mediterranean had not brought at a

[1] See the discoveries, referred to above, at Mas d'Azil, at Brassempouy and elsewhere.

later period other civilising influences. This fact demands a fuller demonstration than can be given here and this I mean to furnish in a later publication.[1]

The Umbrian rule would have extended itself still more toward the South to Italy, and would probably have occupied the whole of Latium if Etruscan civilisation had not come in to interrupt the progress of Umbrian expansion. As has already been said, the Etruscans occupied Mediterranean Umbria and very much reduced the Umbrian territory. They changed the civilisation for the most part, introducing their own, restored to the Italians their funeral custom of inhumation, and finally destroyed the Umbrian power by the invasion and occupation of Felsina.

The Etruscans, as is shown by my anthropological researches, were also a branch of the Mediterranean stock, eastern Pelasgians, inhabitants of Western Asia, with a civilisation much advanced with oriental institutions and characteristics. Their physical characteristics are therefore those of the Mediterranean stock, of which the Italians are a branch. For this reason it is impossible to distinguish their skulls in the Etruscan and Felsinean tombs from those of the Italians, which have the same forms. I have Etruscan skulls from Cere and from Orvieto which are typically identical with those from Alfedena and Rome. If then in the Etrusco-Felsinean burying grounds there are two ethnical elements, as has been seen, the one Aryan and the other Italian, the latter is not different from the Etruscan. This does not disturb in the least our previous demonstration.

The colonisation had various effects among which was disaster to the Aryan rule in that region, which was then Umbria, and an extraordinary effect upon the civilisation and dominion of the truly Italian element. Because that part of Latium which had been already invaded by the Umbrians was freed from the Aryans by the Etruscan invasion from the North, and was free forever.

Hence it happened that that nucleus of races had already felt the Aryan influence, and afterward the Etruscans, freed from for-

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[1] This will be published under the title of *Arii e Italici*.

eign rule, founded Rome, upon the left bank of the Tiber, as a bulwark against invasions and the dangers threatened by a new power which was substituted for the Aryan, that is, the Etruscans collected on the right bank of the Tiber, who had not delayed in conquering Latium as they had conquered Western Umbria, and afterward the region beyond the Apennines.

With the origin of Rome the Italians acquired an independent state, extended themselves into Latium, destroyed the rule of the Etruscans, with whom they soon entered into conflict, and created the Latin civilisation which is truly called Italian. The earlier people, the Aryan or Umbrian, and the Etruscan, were foreign. It is true that the Aryan civilisation contributed something new, but it was more the Etruscan civilisation which brought new influences and elevated the Italians of Latium to a superior rank. But both civilisations were importations of foreign peoples. The Latin civilisation rose above them and with its own very marked characteristics from which emerged the peculiar grandeur of the whole Mediterranean civilisation.

This appears to me to have been the general history of that people which is called Italian, and of the so-called Aryan civilisation. It is shown directly and clearly by archæological and anthropological facts.

From this history there may be obtained another interpretation of the origin of the Italian languages with the Aryan inflection, that is, the Latin, Umbrian, Sabellian and other languages were transformed into Italian by the influence and domination of the Aryan. But that does not make Italians of the Aryan people who came into Italy with a language already formed, as is admitted by philologists. It might be shown that the same phenomena happened in Greece which was transformed by the Aryan invasion. This is clearly shown, if it is true that the primitive Aryans were a people divided into three principal branches which to-day bear three ethnical names.

Thus we have arrived at the establishment of the facts that the Aryans were represented in antiquity by the ancestors of the Celts, the Germans, and the Slavs; that no Italian people and no Hel-

lenic people were among the Aryans; that the Aryans were foreign to Italy, a stock different in physical features; that the Aryans were not the creators of the two great classical civilisations, the Latin and the Greek, because they were barbarous and inferior to the people of Italy and Greece; that their greater influence was exerted in transforming the languages spoken in the two nations and not upon the civilisation. The civilisation was Mediterranean, a civilisation which for the third time became dominant in the Basin of the Mediterranean in Europe.

G. SERGI.

ROME, ITALY.

THE EVOLUTION OF RELIGION.

I. THE HUMANITIES.

SINCE THE DAYS of Linnæus the classification of plants has progressed at an ever increasing rate until the world has been ransacked for vegetal forms. Since the days of Cuvier systematic zoölogy as classification has progressed in a like manner. The success attending efforts early stimulated the students of mankind to engage in the same method of research, so that men were studied as animals for the purpose of classifying them. This enterprise has enlisted the labors of many men and instigated a vast system of anthropologic research by which there has been developed a great body of literature relating to the anatomy and physiology of men, while science has been enriched thereby; but the classification of men into races has made no progress. No one table of races receives universal assent or commands any large following.

It is now evident that the task is impossible. Human evolution does not result in the differentiation of kinds of animal men, but in stages of intellectual growth. The further men are traced into antiquity, the more diversified they appear as animal forms. Had the laws of evolution pertaining to animals remained efficient, and had not these methods of culture been developed, the human species which primordially exhibited varieties pretty well distinguished, would have continued in this development until distinct species were found; but culture results in the admixture of streams of blood, so that the earlier varieties of mankind are now so blended by intermarriage that the ancient varieties are thrown into inextricable confusion, and there results a re-unification of mankind as one species.

The law of physical adaptation to environment observed in the evolution of animals is gradually repealed in the case of man by the substitution of the law of culture. For example, man is not adapted to a cold climate by the development of a protective covering of hair, but he invents shelter, clothing, and fire; so that the environment is a factor in the evolution of his mental rather than of his physical characteristics. Man does not develop webbed feet or fins to become a denizen of the water, but he invents a boat and sails in a winged palace. It is possible to enumerate a catalogue of such conditions which seems almost endless; and in every case where environment is productive of distinctive physical characteristics in the lower animals, it is productive of intellectual characteristics in man. It therefore may be affirmed that while the lower animals are adapted to environment, man adapts the environment to himself. It is thus that the study of human evolution is resolved into the study of culture.

While the science of ethnology remains as a study of the anatomy and physiology of men in multitudinous varieties which do not admit of classification but only of characterisation by extreme types, a new science has been developed in the study of the characteristics of culture found among the various tribes and nations of the earth. This science I call Demonomy, or the science of the Humanities. Logically this science is divided into five departments, as follows:

First. Art, which is developed as human activity for the purpose of obtaining pleasure.

Second. Industry, which is developed for the purpose of promoting welfare.

Third. Government, which is developed for the purpose of establishing justice.

Fourth. Language, which is developed for the purpose of expressing thought.

Fifth. Education, which is developed for the acquisition of knowledge.

These five humanities are co-ordinate, correlative, and interdependent. If a pleasure is pursued that does not insure welfare,

it turns to pain. If welfare is pursued that violates justice, it ends in injury. If justice is pursued on the evidence of those who are false, injustice is done. If the truth is sought from men who have not the knowledge, error will be found. Finally, if knowledge is sought and error found, knowledge, justice, welfare, and pleasure fail. Truth is the word of knowledge, justice is the act of knowledge, welfare is the reward of knowledge, pleasure is the enjoyment of knowledge. This is the solution of the problem of ethics. Ethical conduct is not built on pleasure alone, nor on welfare or utility alone; nor is it founded on any single principle, but it has a pentalogic basis in pleasure, welfare, justice, truth, and wisdom. He who travels the righteous way must have a five-fold purpose in indissoluble unity.

The humanities require further characterisation. There are five classes of fine arts: Music, Graphics (as sculpture and painting), Drama, Story, and Poetry. The science of welfare or industry is the science of Technology. It is divided into Bioculture, Mining, Manufacturing, Transportation, and Exchange. The science of justice or institutions is the science of Sociology, divided into Statistics, Economics, Civics, History, and Ethics. The science of expression or language is Philology. There are five kinds of language,—emotional, gestural, oral, written, and conventional language, or that language which is devised in the arts and sciences for special purposes, as mathematical symbols, chemical symbols, etc. The activities which are pursued for knowledge and by which opinions are developed give rise to education, as, first, the cultural instruction derived from social industry; second, the accultural instruction of parents, kindred, and society; third, scholastic education; fourth, publication; fifth, scientific research. All of these activities are indissoluble in their results, for when one of the five purposes is pursued unwisely the common goal is not gained, and they are also bound together by other ties. The pursuit of art becomes an industry, as when men make music for others for compensation. The pursuit of welfare is always accompanied by the pursuit of pleasure. This gives rise to Ambrosial pleasures in catering to the palate, to decorative pleasures in form and color, to

competitive pleasures in physical and intellectual gain, to the pleasures of ambition in government, to the pleasures of rhetoric in speech, and to the pleasures of learning in education, while the conduct of institutions and education becomes industries.

We have divided each one of the five activities into five groups, and every one of the twenty-five may in like manner be subdivided. For present purposes civics, or the science of government, must thus be subdivided into constitutive, legislative, executive, operative, and judicative government. The science of constitutive government treats of the constitution of tribes and nations; the science of legislative government treats of laws and the making of laws; the science of executive government treats of the enforcement of laws; the science of operative government treats of the industries carried on by the government, as in education, postal operations, etc.; while the science of judicative government treats of the adaptation of laws to individual cases by interpreting and applying them as principles.

It has already been stated how the law of adaptation to environment is transformed by man into the law of the adaptation of environment to man. The survival of the fittest, which is the chief method of evolution in the plant realm, depends on the enormous multiplication of individuals when but few can survive; but this law applies to mankind only in a subordinate manner, because the rate of multiplication is so greatly diminished that the method becomes comparatively inefficient. The action of the law of effort, which is the fundamental method of evolution in animals, is transformed by man into the law of culture, thus making mental evolution take precedence of physical evolution.

Having failed to classify mankind as races of animals, we still find them grouped as tribes and nations into states which take rank in culture. The tribes are of two radically distinct kinds, and the nations also are differentiated into two more or less distinct kinds. The tribes are called savages and barbarians, and the nations are sometimes said to be civilised and enlightened. For reasons which cannot here be set forth for want of space I shall use the terms monarchacy and democracy instead of the terms civilisation and

enlightenment. We therefore have four kinds of people living in four stages of society, which we call savagery, barbarism, monarchacy, and democracy. It is proposed briefly to set forth the characteristics of these four kinds and stages of culture by describing the humanities in each, and their pursuit by religious agencies. Hard and fast lines cannot be drawn, for the higher is always evolved from the lower.

In religion the humanities are considered as superlatives; pleasure is beatitude, welfare is blessedness, justice is righteousness, expression is truth, and knowledge is wisdom. Then the superlatives as good have their antitheses as evil. Good and evil as boon and bane are considered as gifts from unseen beings in an unseen world. In moderate and common degrees good and evil are the results of human conduct, but in superlative degrees good and evil come from gods. Religion, then, is a system of activities to obtain beatitude, blessing, righteousness, truth, and wisdom, as the chief good by enlisting the good offices of unseen beings in the unseen world. The activities of religion are therefore coextensive in purpose with the humanities, but are held to be of supreme importance.

II. SAVAGERY.

The activities of savagery designed for pleasure are mainly terpsichorean, but people in this stage also have ambrosial, decorative, and competitive pleasures. Ambrosial pleasures give rise to many feasts; decorative pleasures give rise to many strange costumes—to painting, tattooing and mutilating the body, and to the decoration of all the products of their industrial arts. Competitive games are many, both athletic and divinitive; while such games as cards, drafts, and chess are games of skill in modern culture, they are games of divination in savagery. Music is rhythm. Sculpture in wood, horn, shell, bone, and stone produces only painted totemic images. Drama is the thaumaturgic representation of the myths of mythology. Poetry is exclamatory song with rhythm marked by musical accents. Savagery may be called the age of rhythm, for it is the chief characteristic of the music and dance of the people.

The industries are hunting, fishing, and fruit and root gather-

ing, while in the last stages of savagery petty agriculture is practised. There is a great variety of mechanical industries in the utilisation of the materials of the environment for shelter, clothing, and food. From the manufacture of stone tools savagery is known as the age of stone.

The governmental institutions of savagery have peculiar characteristics. The family as it exists in civilisation consists of parents and children, with such other members as the exigencies of life determine; but families are again regimented into higher groups, and every household or family is divided, for the husband belongs to one group, while the wife and her children belong to another; these groups are called clans. The husband belongs to the clan of his mother, while the wife and her children belong to the clan of her mother. For clan regimentation, therefore, the people are grouped by female descent. There may be from ten to twenty or more clans in a tribe. The man cannot marry in his own clan, but must marry a woman of some other particular clan. Sometimes the right and duty is less restricted and may be extended to two or even more particular clans, or may even be unrestricted as to other clans. The clan is usually given the name of some animal or other object of nature, and this is known as its totem. This totem becomes a deity. The members of the clan all take names from some kind, characteristic, or myth of the totem. The clan is governed by an elder man, and the members of the clan call one another kinship terms; but two words are used for brother, one as elder brother, the other younger brother, and two words for sister, as elder sister and younger sister, and there are elder cousins and younger cousins; so that in addressing another person by a clan kinship name relative age is expressed and superior age always gives authority. In speaking to a person in the clan it is unlawful to use any other name than this clan name by which authority is claimed or yielded. A group of clans constitute a tribe; thus the clans are bound together by ties of direct affinity and remote consanguinity. The chief of the tribe is the elder man of the elder men of the tribe; age, however, is not only natural but conventional, for men are promoted in ageship for superior virtues by a

system of elections in the clan council and also in the tribal council. Tribes are sometimes united into confederacies, and these tribes are by convention in council assigned to particular forms of kinship; they may be brothers, elder and younger, or they may be father and son, or they may be grandfather, father and son, uncles, nephews, and grand-nephews; thus they become kindred by legal fiction. Promotions are made in the confederate chieftaincies by the confederate council. There are diverse methods of organising the council, choosing war parties, and selecting war priests. Savagery is the age of the clan.

The language of a savage tribe is so foreign to the ideas of an English speaking people that an intelligent account cannot be made clear in brief, and this statement must suffice. The sentence is imperfectly organised from the fact that the parts of speech are imperfectly differentiated, but a word usually resembles an entire phrase or even an entire sentence; for example: *to kill with a stone a man who is lying on the ground while the slayer is standing*, may all be expressed in one word. This method of speech is called holophrasm, and savagery is the age of holophrasm.

In education we find the characteristics of most importance for the present discussion; for the influences of the deepest significance in savagery are those which arise from mythology and the teaching and practice of religion, for theology is mythology and teaching is instruction in religion. The supreme beings are animals, so in savagery mythology is zoötheism. Savages do not worship the existing animals, but have a notion that they are descended from primordial animals far superior to those now existing. They worship the sun, moon, and stars, but suppose them to be zoömorphic and often teach that they were formerly denizens of the earth transported to the sky for various mythologic reasons. In affirming that the gods are zoömorphic it must be remembered that the plane of demarkation between men and the lower animals is not conceived as existing in the same sense as in modern times, for the animals are supposed to have powers in many respects superior to men. One species has exalted power of a particular

kind, another of another kind, and every one has some power superior to that of man.

They also believe in the magical transformation of animals from one kind into another, and of this power man himself partakes. In the beginning all tribes, for they speak of animals as tribes, had this wonderful power of transformation in a superlative degree, from which they have degenerated so that now there are but few individuals arising from time to time that have the ability to perform this feat. Certain inanimate things are supposed to have been animate and to have been transformed into rocks, hills, mountains, plants, or celestial bodies. The sky is a solid dome; with some tribes it is ice, and with others it is rock crystal. All savage tribes believe in seven worlds, or regions; this world, the east, the west, the north, the south, the zenith, and the nadir. The people of this world originally came from some one of these outer worlds, usually the nadir; and magical people, as some great priests, can visit these worlds, and many of their myths recount these journeyings. The winds are the breathings of beasts inhabiting the cardinal worlds and sometimes visiting this. They have no knowledge of an ambient air. Thunder is the cry of birds, lightning flashes are serpents, usually the rainbow is a serpent; the rain from the zenith is explained in many ways,—sometimes as the abrading of the ice of the zenith.

Religious worship is the invocation of these gods to procure benefits and avoid evils. In arid lands the chief blessing sought is rain as the bringer of harvests; in humid lands the prayer is directly for bounteous fruits. All disease is the work of witchcraft, to a slight extent of human witchcraft, but mainly of animal sorcery, and particular diseases are referred to particular animals; thus one disease is called the deer disease, one the turkey disease, one the spider disease, and another the fly disease. So the diseases are parcelled out among the animals. The treatment of disease is always by sorcery. Should a man fall on the cliff-side and break his arm, it would be attributed to a "rock rover," who caused him to stumble. A child bitten by a rattlesnake is treated by placing

the rattlesnake beside it and with various ceremonies invoking the heart of the rattlesnake to return from the child to the serpent.

The methods of worship are innumerable in their details and diverse in their special characteristics from tribe to tribe, but the same principles are found in them all. The priests are always a special class, and the people are all organised into societies presided over by priests who have charge of special ceremonies designed for special purposes, and have charge of special medicines which are always administered ceremonially.

The religious ceremonies are long, and with every tribe a number are performed at intervals through the autumn, winter, and early spring. Through the year there are many four- or seven-day periods intended to provide for harvests and game, with a fast and a festival. In the dramatic ceremonies the priests and their assistants personify the personages of their mythology, and wear masks or other insignia to represent such characters. The paraphernalia of the altar, which is usually within some kind of a lodge or kiva, is very elaborate. The personages represented by the actors are also represented by carved images in stone or wood, or sometimes painted on bark or on the skins of animals. Vases of pottery contain holy water; curious and beautiful crystals are collected, especially in arid lands, to represent the color and hardness of well-matured corn. The feathers of birds are used in many ways to decorate the altar, but always having some mysterious symbolism. The dramatic performances represent scenes in the mythologic history of the tribes and of the gods whom they worship, interspersed with many harangues by the priests instructing the people in mythology and religion. From time to time terpsichorean performances are introduced, and a half of the time for the four or seven days may be occupied with music and dancing, but the whole ends with a great festival.

In savagery the fundamental opinions are mythologic, the gods are zoömorphic, and worship is terpsichorean.

III. BARBARISM.

Peoples in the barbaric state have music in the stage of melody. Painting takes a step in advance, for in savagery it represents the outline of the object wholly flat, while in barbarism relief is found. Drama makes an advance, especially in dialogue. Story has mythic heroes, but they are power-gods, and poetry is developed from the chanting of exclamations to the stage of song adapted to melody, and is often alliterative.

In industries agriculture is more highly developed, so as to furnish food for men and animals, and animals are domesticated. Manufacturing is advanced to a higher stage by the development of tools made of bronze. In clothing the skins of animals are utilised only to a small extent, while the hair and wool of animals and many vegetal fibers are wrought into fabrics. The improvements in tools make possible a decided advance in architecture, and men no longer live in houses covered with bark, boughs, and rude thatch or in chambers excavated in tufas and friable rocks, but they build houses of wood and stone usually covered with boards made by riving trees or by deftly woven thatches, though rarely houses are covered with dry and indurated mortar.

The advance in institutions is more important in this consideration. The development in bioculture, in the cultivation and the domestication of animals leads to an accumulation of wealth, and with it there are beasts of burden and a great exchange of wealth from tribe to tribe results; then the more peaceful life of savages becomes the more warlike life of barbarians by the greed for plunder on the one hand and by the development of warfare through the utilisation of bronze. Gradually tribes become nomadic at certain seasons in search of pasture for flocks, and to extend the field of plunder. With these changes constitutive government is changed. When clans move from place to place in search of better ground to cultivate, or larger streams to use in irrigation, or larger fields for the sustenance of animals, wives and children must go with husbands and fathers and no longer remain under the control

of brothers, maternal uncles, and grandfathers, but come under the control of husbands, fathers, and paternal grandfathers. There are other agencies at work at these changes in religion, which for present consideration may be neglected; but finally the result is to transform the clan into the gens, a group of persons reckoning consanguineal kinship in the male line, and the children follow the gentile descent of the father instead of the clan of the mother. The chief of the gens is still the elder man of the clan in years or by legal fiction. The patriarch clothed with family and gentile power is also the owner of the gentile property, especially when it consists of lands, flocks, and houses. With a large number of persons and a large accumulation of property he has the means of enforcing authority unknown in barbarism, but the gens may unite with other gentes into a tribe, and these tribes may again unite into confederacies. The motive impelling the union of gentes into tribes is peace, and the bond by which they are held is the marriage tie.

In the 34th chapter of Genesis there is recorded a proposition to organise a barbaric tribe:

"And Hamor the father of Shechem went out unto Jacob to commune with him. . . . . .

"And Hamor communed with them, saying, The soul of my son Shechem longeth for your daughter: I pray you give her him to wife.

"And make ye marriages with us, and give your daughters unto us, and take our daughters unto you.

"And ye shall dwell with us: and the land shall be before you; dwell and trade ye therein, and get you possessions therein."

There is a method of regimenting clans within the tribe which is developed rather late in savagery and which becomes of paramount importance in barbarism, for the priestly or ecclesiastical societies now play an important rôle. The people of the clan are divided into these societies which they voluntarily join for the purpose of being initiated as priests or assisting as devotees. Gradually the ecclesiastical societies become organised and consolidated on a schematic plan founded on the mythologic worlds or regions. The persons who belong to the north-world region constitute a north-world brotherhood, and in like manner each religion has its brotherhood. This is the origin and significance of the phratries

found in barbaric society. The phratry is an intermediate unit between the gens and the tribe; the phratries being gentes primarily organised by worship on the scheme of the seven regions. In barbarism the five units of regimentation, namely, the family, the gens, the phratry, the tribe and the confederacy are usually kept distinct, and the governmental functions well differentiated, though in the tribe and confederacy chiefs may be derived from the gens and also from the phratry and often, perhaps usually, the chief of the phratry is also chief of a gens, the two offices being united in one person. The priestly brotherhood play an important part in barbaric society and continue their influence in the next stage, and are even continued under a changed form to the present time.

The zoötheistic religions of savagery become physitheistic in barbarism, often without even changing the names of the gods, but always changing their attributes. The celestial gods take on anthropomorphic forms and become leading personages in the pantheon as great powers in nature. The sky itself is personified as a deity and the beast-god of the wind becomes the man-god of winds, the beast-god of rain becomes the man-god of rain, the beast-god of thunder becomes the man-god of thunder, the beast-god of lightning becomes the man-god of lightning, the serpent of the rainbow becomes the man-god of the rainbow, and other zoömorphic personages become powers with human forms. This is the stage of theism so well described by Max Müller and exhibited in the most ancient records of India, Egypt, Greece, and Rome. Hesiod has told of these gods and Homer sings their praises.

In savagery there are many deities of merriment, jest, and cunning, which live on to barbarism, but quite a new class slowly appears as gods of evil who bring hurricanes, floods, frost, and fire, and to whom other great disasters are attributed. In this new form the principal deities are organised into a tribe over which a chief presides and mythology largely becomes the history of a tribe of deities with many incidental personages from the lower grades of supernatural beings, but the home of the supreme deities is fixed in the zenith from which the members of the tribe journey to other regions.

The terpsichorean worship of savagery wanes in barbarism and the dramatic worship is more highly developed, while the insignia of the altar are multiplied and the drama becomes more conversational and poetic. A new system of deities appears in the pantheon and a new system of worship is developed. The totemic deities of the clan are now replaced by ancestral deities of the gens; thus ancestral worship itself originates, and it finally becomes the duty and the delight of the household to keep up ancestral worship in many ways, especially in the preservation of the ancient fire of the home.

In savagery there is a system of oblations which at first appear to be symbolic and mnemonic as suggesting to the deity the nature of the blessings for which prayers are made; thus, minute quantities of food and drink are placed on the altar, or representatives of these things are painted on the shrine or represented in other ways, while ears of corn and other forms of food are exhibited, jewels are shown, and the gods are asked to supply like things. Oblations are made at meals and on many occasions. Gradually the quantity of these offerings is increased until at last it becomes a sacrifice. In ancestor worship these sacrifices are especially noticeable, and they finally become gifts to forefathers who are supposed to use them in the zenith world. Finally the worship at the hearth becomes equal in importance to the worship in the kiva, and the worship by sacrifice becomes the fundamental worship in which piety is measured by sacrifice. More and more the patriarch becomes the teacher and gathers the gens about him, while subordinate families assemble for instruction by households. Gradually also the myths are wrought into crude poetry and taught in this form, while the precepts of religion are coined into verse with many maxims of right and duty. While in savagery the gods were induced to give boon for pleasure as they were supposed to enjoy the terpsichorean ceremonies of the clan, now they are solicited by offerings to promote their welfare. Still the idea of sacrifice remains uppermost, and from sacrificing food and drink in hecatombs of beeves and jars of wine the gifts become human lives; first of enemies captured in battle, then of individuals of the tribe who have of-

fended, and finally of the best beloved sons and daughters. Barbaric worship is sacrifice.

In the tribe five kinds of worship are ultimately recognised: The worship of the family, the worship of the gens, the worship of the phratry, the worship of the tribe, and the worship of the confederacy. In the family the altar is the hearth about which there are special places for the paraphernalia; in the gens the worship is at the hearth of the patriarch, and it may absorb all the worship of subordinate households; in the phratry the worship is in the kiva or pyrtaneum; later there may be a kiva for the tribe and still another for the confederacy; and finally when confederacies dwell in cities the great kiva becomes the temple.

IV. MONARCHACY.

In monarchacy music is developed to the stage where harmony is recognised. In graphic art linear perspective is observed. In drama the theme is magic, the actors supernatural beings and human puppets. Story has the same theme as drama; in poetry also the theme is magic, and it often takes the form of rhyme.

Bioculture is more highly developed; but that which is most important to note is the development of manufactures in the utilisation of iron, so that it is often called the iron age. Architecture is more highly developed both in the homes of the people and in the homes of the gods, and the kiva of primal society becomes the temple of civilisation. In savagery transportation by water is in canoes hollowed out of tree trunks, or in boats of skins or fashioned of other materials and propelled with paddles. In barbarism oars were added. In monarchacy sails are hoisted, and men journey far from land, and a great commerce is developed.

The introduction of iron weapons changes the nature and methods of warfare. Militancy is no longer a succession of raids for plunder and fancied revenge for mythologic injuries, but is systematic conquest that peoples may be reduced to slavery as the servants of the conquerors, or reduced to dependencies for tribute giving and supplies of soldiery. In savagery there is a form of slavery which is adoption into the family and clan, when the cap-

tive takes rank in the clan from the date of his adoption as children born in the clan take rank from birth. This form of slavery is continued in barbarism, but with important modifications, for sometimes promotion becomes impossible; but in monarchacy the slave belongs to a lower caste from which he cannot rise, and usually is attached to the soil as a realty. Late in monarchacy the slave becomes a chattel.

Now, we must consider the origin and the nature of monarchacy. We have already found the confederacy to be a group of tribes organised by kinship as a legal fiction; but in barbarism the tribes are thus scattered in towns, while in savagery the clans may be scattered in villages or hamlets, but when confederacies unite to live in a walled city monarchacy is born. Superior tools lead to superior architecture, and superior architecture leads to the erection of superior defences, and superior defence masses the people in cities. Then cities become workshops, and the products manufactured become goods, and goods become cargoes, and the mariner journeys afar for trade, and a world-wide barter brings the products of all lands to every city. Cities grow and become powerful in number and wealth. Weaker cities are conquered and made provinces; tribes also are conquered and their countries made tributary provinces. A few of the conquered peoples are made slaves, especially the poets and other artists and the artisans, while some of the common people are taken as laborers to toil on pyramids, temples, mausoleums, city walls, and viaducts, or to drain swamps and cultivate fields. The people of such a city for a long time retain distinct tribal, phratral, gentile, and family government; but propinquity, a common language, common employments, and common interests unite to break down the barrier of gentile incest, and incest itself is expressed in degrees of consanguinity and sometimes of affinity. When streams of blood are so intermingled that gentes can no longer be traced, the people are no longer regimented by affinity, and artificial regimentation by territorial boundaries takes its place. But the kinship method of regimenting people is never wholly lost in monarchacy, but remains within a small number of people who aspire to be rulers and who often are the actual rulers.

Thus a ruling class is preserved. A second class arises through the phratral organisations transformed into ecclesiastical bodies, and the priests are privileged. War has now developed, when it may be conducted on a vast scale for the conquest of provinces, and a warrior class springs up, the leaders of which also become a wealthy and privileged class. Thus we have the three estates. Now the artisan class is differentiated by trade, and a system of guilds is developed. The laborers on the public works and the people who are engaged in agriculture remain as nondescript bodies from which all the classes, so-called in the three estates, and the guilds hold themselves socially aloof. There is an attempt to make all of these classes hereditary, but it ultimately succeeds only with the ruling classes, for when war comes the peasant may fight as well as the king and success in war brings honor and promotion. The priestly class is not even able to keep its members within itself, for new leaders and teachers spring up to establish new societies with new priesthoods. Some in the guilds attain great wealth and can command position in one or other of the three estates, while many in the guilds fail and become mere laborers or even outcasts.

The monarchacy thus begins by the settlement of a confederacy in a walled city, extends by annexing tribute-paying provinces, and finally assumes the ultimate form of national organisation; and the provinces are not considered as subject provinces, but the whole territory of a monarchy is divided into districts with a more or less equal government for every one, and equal rights and duty pertaining to all but modified by rank.

In the city-state the people speak a common language, but often the provinces speak diverse languages. The form of language in this stage is inflectional.

Education becomes something more than instruction in mythology and religion, for a new discipline is early developed and a new body of learning, usually called philosophy, is its theme. The purpose of this philosophy is the explanation of the properties of the bodies of the universe, which are confounded with qualities, and the latter name is usually employed in their designation. An

attempt is always made to reduce all properties to one and thus to explain the universe as monistic. Five stages of this philosophy appear in succession: the Pythagorean philosophy, where the properties are explained as numbers; the Platonic philosophy, where the properties are explained as forms, so that even ideas are called forms (the Greek word idea originally meant form); the Aristotelian philosophy, in which all properties are explained as forces; the Scholastic philosophy, where all properties are explained as being or existence; and the Idealistic philosophy, where all properties are explained as ideas. In this stage the schools are organised for the purpose of teaching philosophy and all the ancient and venerable universities of civilisation have this origin.

Gradually a belief in the cardinal worlds is abandoned, but a heaven above and a hell beneath are retained.

The physitheism of barbarism is transformed into psychotheism, and the deities have psychic attributes, though to a large extent the names of the deities remain the same. Thus there is a god of war, and a god of love, a god of agriculture and a god of commerce, a god of hunting and a god of fishing, and in like manner the chief psychic attributes of mankind and the vocation which they follow are all represented by deities in the pantheon. At first the gods constitute a tribe, then they inhabit a city which is above on some mountain like Olympus or in the sky. As time goes on the constitution of the tribe of deities is changed, and the supreme deity is exalted more and more until a qualified monotheism is established.

Worship changes and terpsichorean ceremonies are gradually abandoned, sacrifices are continued, but modified and ameliorated, becoming symbolic. Ceremony is refined and becomes a vast system of symbolism, so that worship becomes highly poetical. Gradually a new element is added to religion, and at last becomes its chief characteristic. Gods who were supposed to be pleased with dancing and then pleased with oblations are now supposed to be best pleased with opinions, and to be worshipped in spirit and in truth through creeds that work their effects in the hearts of men impelling them to righteous conduct. Religion is fiducial, and men

are held to be pious who acknowledge God in all their ways. Another change comes, for men pray less for present blessings and more for blessings in the future world.

The crime of crimes in savagery is witchcraft, in which it is supposed that the gods are induced to do evil to men. This crime lasts on through barbarism and is punished with still greater rigor; it still continues in the third stage and those who practice it are condemned to death. In barbarism the crime of blasphemy is developed, consisting in the omission of rites or in acts of disrespect. This also appears in the third stage. In monarchacy yet a new crime is developed, for creed now becomes essential and the heretic receives more horrible punishment than the witch or the blasphemer.

During the stage of monarchacy six great religions were developed: Judaism, Confucianism, Hindooism, Buddhism, Islamism, and Christianity. In all these religions the priests are propagandists and desire to make their doctrines universal. The great majority of the peoples of the globe are worshippers in one or another of these systems, but there are a few followers of Zoroaster and of Lau-tsze, a few barbarians, and a few savages. Idolatry has never been a religion, but in all the three stages idols are found as insignia of shrines.

V. DEMOCRACY.

Democracy has existed as a dream since the palmy days of Greece and Rome, but only as the equal rights of individuals in a class while the classes are in hierarchies. In a better form it was first established in the little republic of Switzerland. The principles on which genuine democracy rests have their origin in the development of modern industries, and the discovery of the New World may be taken as a convenient date for the beginning of this period.

Now, music is not only rhythm, melody, and harmony, but it is also symphony as a succession of rhythms, melodies, and harmonies. To graphic art is added a new element in aerial perspective. Drama represents the doings of men rather than of mythical

heroes. Story is the tale of human life, and the chief themes of poetry are the beauties of nature, the charms of simple life, the tragedies which spring from error, the triumphs of truth, and the boon and bane of love.

In this stage human slavery is gradually abolished, and the powers of nature are enslaved. The places of the stars are fixed as signals for mariners, the compass becomes the guide of the sailor, fire becomes the tool of the miner, steam is the servant of manufacturing and the beast of burden for commerce, electricity is the messenger to distant lands and neighboring homes and at last the steed of the chariot of common life. As the dugout developed into the boat and the boat into the ship, so the ship has developed into the ocean palace. In savagery tribes communicate thought in gesture-speech. In barbarism tribes communicate thought in picture-writing. In monarchacy nations communicate thought in writing. In democracy nations communicate thought by lightning-speech.

The age of democracy is the age of machinery, and has sometimes been called the age of steel, because this substance is largely used in tools and also in machinery. Machinery has not only revolutionised the arts, but it has revolutionised society itself, for it has largely destroyed guilds as trades and apprenticeship as a system of learning trades, since to a large extent the skill has been transferred from the man to the machine. This revolution is just now in progress. Transportation has also been changed and a new system of industries developed which again has reacted on systems of exchange. In these and various other ways the regimentation of the people for industrial pursuits has been transformed by the organisation of a system of corporations, some of which are gigantic and embrace operations as great in extent as those in which nations once engaged.

Language is no longer inflectional as a device adapted to disputation and a discipline of word learning, but it becomes organic by the development of more thoroughly differentiated parts of speech, and thus becomes the instrument of exact and logical expression adapted to the communication of scientific thought.

When the good queen sold her jewels she little dreamed that she would emancipate the people from the chains of mythology to roam at will in the sunlight of science; but so it has happened. Science could not lift her head in the presence of mythology, until its disciples had demonstrated the spheroid figure of the earth in such a manner that all were compelled to believe it. Who shall say that the impetus given to science by Columbus was not a greater boon to mankind than in the gift of a continent of new homes for an enlarged theatre of peoples? It needs not to portray the rise of republics in various portions of the world, nor to set forth the development of representative institutions in the nominal monarchies of western Europe, in America, Africa, Asia, and the island nations. Some of the republics are not yet pure democracies, and some of the monarchies are far from being pure monarchies; but as the years pass the metamorphosis is accelerated.

It was stated above that savagery is a more peaceful state than barbarism, that barbarism is a more peaceful state than monarchacy, and now it may be affirmed that monarchacy is a more peaceful state than democracy. As the club was exchanged for the sword, and then the sword for the bayonet, and then the bayonet for the cannon, armies underwent a corresponding change in organisation by adaptation to new methods of warfare, and wars have increased in destructiveness, in strength of legions, and in frequency of battles. The armies of the more civilised nations have steadily increased since the days of Columbus, and during that period have greatly outnumbered the armies of antecedent times. The wars which the more highly civilised nations have waged were never before equalled in atrocity or slaughter. The international wars of Napoleon and the civil war of Grant were never before equalled in magnitude. Of the three most potent factors in the transformation of society before Columbus, namely, industrialism, militancy and religion, it cannot be said that progress is from one to the other, but that all have developed each in its own sphere. Industry has developed to the stage of machinery, and war has developed to the stage of gigantic armies.

Since the common people have known that the world was

round, and the concept is no longer in the possession of the few, scientific research has been organised. The germs of research were planted by Aristotle and other Greeks, but they never grew to maturity until scientific men exhibited a series of splendid results which captivated mankind. The schools were devoted to philosophy and disputation. But little by little the disciplines of science, when they could no longer be ignored, were introduced into the seats of learning. The leaven worked a transformation, so that the schools became agencies of research and instruction in science as well as in philosophy. Gradually philosophy itself came to be known as metaphysics by the accident of a word. At last schools, individuals, and finally governments were enlisted in the work of research, and metaphysics has been relegated to a discipline for one of the years or even one of the scholastic terms in the life of the student. The public schools, colleges, and universities are now engaged mainly in the teaching of science. At last a fourth factor or potent mental agency in civilisation has been developed, so that now industry, militancy, religion, and science are the four supreme agencies of change, and the new agency subordinates them all.

It is important to note here the metamorphosis wrought on religion by science, which comes to purify but not to slay. Not as the ages go by, not as the centuries lapse, but as decades fly, a change is wrought in the human conception of the attributes of deity. The pleasure of worship is becoming the contemplation of perfection, the form of worship the agency of instruction, the cause of worship the love of humanity, the purpose of worship the purification of conduct. This is the ideal state to which religion is tending, and it must be understood in order properly to appreciate the characteristics of the existing religions. In the primitive world religions were many, because tribes were many and languages many, names many, and totems many; but they were all on one plan, to secure one purpose, namely, that of pleasure, and to give pleasure to the gods. They were still many in barbarism, though not so many, but all designed to obtain welfare and to give welfare to ancestors. Then religions became few and sought to yield trib-

ute of praise and allegiance to gods, and to gain bliss hereafter with incidental prosperity now. Much of ceremonial worship remains yet in this the first period of the new stage in the evolution of religion. Much of theoretic and practical sacrifice remains; much of creed remains, but more of scientific truth. As this last agency approaches perfection religion advances, for science has no conflict with it but only with metaphysics.

From time to time during the stage of monarchacy prophets arose who became great teachers. Seeing that true ceremony is only impressive symbolism, that true sacrifice is only immolation of unwise desire, and that true creed is only expression of opinion, and being profoundly convinced that true religion is righteous deed, they sought to convert men to better ways and taught a religion of ethics. Some of these great teachers for a time were successful, but by reason of ignorance and sin disciples continually relapsed into ceremony, sacrifice, and creed as true religion and forgot religion itself. But when Moses and Confucius and Buddha and Mahomet and Jesus could teach the world through the magical speech of books, great teachers multiplied and ethical religions gained ground. In democracy one of the great historic religions prevails, and has attained to Catholicity in that stage; though it has many subdivisions, the teaching of Jesus ever more and more in the spirit of the Sermon on the Mount is becoming the religion of the people. Though this religion is represented by diverse ceremonies and by differing theories of sacrifice, it is unified in practical ethics, but not in theoretical ethics. As the years pass, insistence on ceremony, insistence on sacrifice, and insistence on creed grows less and less, while instruction in ethics grows more and more. Ethical religion, though now often vaguely taught, will triumph in Catholicity.

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LOVE AS A FACTOR IN EVOLUTION.

ONE of the most firmly-rooted and widespread popular misconceptions of the struggle for existence is that only so-called "brute" or selfish qualities are concerned in it. It is assumed to be a relentless and ceaseless war of extermination, whose watchword is, "every man for himself," and in which no quarter is or can be given. Strength, selfishness, and ferocity, "the qualities of the ape and the tiger," are the only qualities concerned in or developed by it. The idea of love, of sympathy, of self-sacrifice playing any part in it, is regarded as simply absurd. Indeed, the possession or display of any of these qualities is gravely declared to interfere with its legitimate result,—the survival of the fittest. Even by those who admit that this cosmic process is sufficient to account for the physical or animal characteristics of man, it is emphatically affirmed that his mental and moral qualities have been acquired not by virtue of it, but in direct opposition to it. Not even the old Calvinistic distinction between "Nature" and "Grace" was more sharply drawn than that between the egotism born of the struggle for existence and the altruism demanded in the ethical and moral sphere. Nor is this impression confined to the popular mind, for no less revered an authority than the lamented Huxley in that most painful and deplorable "swan-song" of his, The Sheldonian Oration of 1893, declares that what we call goodness or virtue involves a course of conduct in all respects opposed to that which leads to success in the cosmic struggle for existence, since self-assertion is the essence of the cosmic process, and unmitigated self-assertion is incompatible with social morality. But much as we love and admire our great leader, so recently taken

from us, we love nature more, and resent any and all such statements as libels upon her great, calm, loving processes. It is easy to see the apparent grounds for this misconception; but we affirm that it is a misconception, nevertheless, as a careful weighing of the facts in the case will prove, and we venture to assert that Love with its daughter, Goodness, is not only a legitimate product of the process but next to Hunger the *most powerful factor* in it.

Before proceeding to a consideration of the question in detail, I wish to call attention to certain obvious facts, that I think are hardly estimated at their true value in discussions of this subject. The first is that the emotion of love itself is a fact as firmly attested by experience as any other in the physical world, and hence from a purely naturalistic standpoint is not only entitled to but *must* be recognised as one of the factors in cosmic progress. In this sense it is as genuine a force in the scheme of progress as gravitation. The animal or man who permits affection to influence his conduct in the struggle is obeying a law of nature just as truly as the one who is influenced by hunger. Love is everywhere in evidence and actually at work and *must* be reckoned with.

The second is that love and its results being everywhere present not only in the human species, in all ages, but in all the countless forms of life, from the very earliest dawn of intelligence and consciousness, there is no conceivable reason why it should not be regarded as a result and part of the process just as much as intelligence, combativeness, or muscular power,—and the real *onus probandi* rests upon those who assert that it *did not* so originate and develop.

As Herbert Spencer pertinently remarks in reply to Huxley, "If the ethical man is not a product of the cosmic process, of what *is* he a product?" Strictly speaking, the struggle for existence and the naturalist are fully entitled to claim love and morality as their own until "revelation" and the supernaturalist have proved the contrary. And while not only in popular but also in a large and weighty proportion of scientific thought the cosmic struggle is regarded as "inadequate" to account for the affections and morality, yet it must also in all fairness be admitted that from a rational

point of view "inadequate" would be an extremely mild form to apply to any of the numerous other attempts to account for them.

The third consideration is that love and selfishness, or, in the language of the day, altruism and egotism, are, instead of utterly antagonistic and destructive to each other as is generally assumed, really complemental and mutually helpful. Both are absolutely essential to progress, and neither could long exist without the assistance of the other. Either of them, if carried or followed to an extreme, will defeat its own ends and prove detrimental to not only the community but to the individual. It may sound paradoxical, but it is nevertheless a fact, that any intelligent and effective egotism must necessarily include a considerable degree of altruism, not only in man but in the beast, the bird, the insect. Unbridled egotism wrecks the "ego" just as surely as it wrongs the "alter."

Probably nothing would give us a more vivid impression of the fundamental and basal character of love than a consideration of the time of its first appearance in the cosmos. For a long time it was commonly assumed in discussions of this question that it was strictly confined to the human species in its purity, and that even here the genuine article was possessed only by the few who had acquired it through the medium of some "gospel" or "revelation."

It was admitted that a pretty good imitation of the emotion was displayed by "the heathen," "niggers," and even the lower animals, but this was officially declared to be mere "blind instinct," "brute impulse," etc., and of a totally different nature from the supernatural or imported variety. But this position has had to be abandoned and the dignity and holiness both of our own "fleshly" affections and those of the lower animals admitted. Love was now said to appear when infancy did, or wherever living and breathing young were born which required protection.

But even this line was too narrow, for it obviously excluded some of the most striking instances of the passion; among birds, for instance, in ants, in bees, in spiders; nay, even in crustaceans, —indeed, traces of the golden thread may be followed down almost to the protozoa. In fact, the date of its appearance is as difficult to fix as that of the creation,—with which it is probably coeval.

Broadly speaking there appear to be two classes of influences or forces at work in the universe. These may be roughly described as centrifugal and centripetal, separating and cohesive, individual and social. Both classes are equally necessary and equally inherent. For instance, the natural tendency of all matter is said to be constant movement in a right line, but everywhere that we find it this influence is held in check by an attraction between itself and other atoms known as gravitation.

Thus gravitation might be figuratively described as a sort of atomic affection. The whole universe is believed to have been formed by this mutual affinity between the particles of its original nebula or fire-mist, causing them to combine first in rings or bands of different density and coolness, then in rotating spheres, and so on through endless combinations of increasing complexity down to the present day.

The nebular hypothesis is the primitive love-story of the solar universe. The power of combination is the mainspring of progress here as elsewhere.

Physicists tell us that the whole difference between the three states of matter, the gas, the liquid, the solid, consists simply in the closeness of the relations between their molecules.

And the more intimate these become, the greater the possibility of permanent variation and consequent progress. The gases of to-day are practically those of the original fire-mist, the fluids have varied but little since the bounds of grey old ocean were established. The wondrous development that we see about us has occurred almost wholly in and through the firmly coherent solids. Without cohesion no progress is possible.

Nor is this cohesion mere contact under external pressure, mere inert resting of one molecule upon another. Suspend a thread in a saturated solution of any crystalline salt and watch the result. From every part of the liquid tiny particles rush to group themselves around it, until it becomes transformed into a solid pillar consisting of almost every atom of the salt in the vessel. There seems to be a positive clan-feeling between the molecules. And not only is this affinity for each other active, nay, aggressive al-

most, but it is also purposeful. The column around the thread is not a confused heap of granules but a wall or mosaic of clean-cut, uniform, delicate crystals often of most beautiful shape and hue. More than this, given the salt in solution and the temperature, and the exact shape of these crystals can be foretold with absolute certainty; the molecules of one salt will invariably rush together and arrange themselves in prisms; of another in needles; of another in delicate and elaborate rosettes or in sparkling diamonds of six, eight, or ten facets and faultless outline. In short, the conviction almost suggets itself that these atoms have not only affection, but its invariable companion, intelligence.

It goes without saying, of course, that this same instinctive impulse of combination is the very essence of the development of those higher forms which we term "alive," even long before consciousness or volition of any sort can be imagined to exist.

If we watch the wonderful and beautiful division of labor among the cells which takes place in even the simplest forms of plant life, must we not almost imagine that some sort of an understanding exists between them? That some sort of blind instinct of devotion or loyalty to the mass accompanies the action of one group of cells in burying themselves in the ground, away from the light, the warmth, the dew, of another in flattening themselves out into leaves, all lungs and no stomach, and of another in shrinking down into the woody fibre of the stem or petrifying themselves into its siliceous coating? In one sense, the relation is on a purely mercantile basis, each group renounces a part of its birthright in order to render certain services to the plant republic, which in return supplies it with food, water, air, or protection as the case may be. And yet it is hard to rid ourselves of the idea that there must be some sort of *esprit de corps*, some dim sense of solidarity amongst them, at all events even if we are not permitted to credit them with kindly intentions or with affectionate sentiments, yet it cannot be denied that their actions possess these qualities in a high degree, in the which they are decidedly superior to many professed philanthropists and reformers among their descendants of the present day.

Nor is the service rendered by any means always consistent

with the welfare of the individual cell, in many cases it is exactly the reverse and it literally "lays down its life for its friends" and performs its chief function by dying.

We cannot deny them the martyr's death or what is more difficult, the martyr's life, though we may the martyr's crown. The same is true of the cells of the animal organism, including those of our own bodies. A beautiful illustration of apparent devotion is furnished by the white cells of our blood, the leucocytes, whose principal function appears to be a protection of the body against all noxious germs or substances which penetrate its tissues. This they do by hurling themselves upon the intruder regardless of whether they destroy, or are destroyed by him, and either overwhelm him by their numbers or failing this, imbed him in their dead bodies so that he may be swept out of the system without being able to attack the other tissues. No enemy can enter the fortress, save over their lifeless corpses.

And the singular thing about it is that they are in no way directly connected with the fixed cells of the body or under the control of the central nervous system.

They are a band of free lances ranging up and down the blood channels, who receive from the body their bread and salt, and in return are ready to die in the last ditch in its defence.

The complete individuals also of most forms of plant-life display a decided tendency to group themselves together in clumps, in patches, and in masses. Nor is this due entirely or even mainly to direct propagation, or peculiarly favorable soil or aspect, but they actually flourish better under certain degrees of mutual pressure. Our grasses and grains, for instance, cannot reach their highest development except in masses. The huge ear and priceless berry of the wheat would be impossible were it not for the support afforded to its slender stalk by its fellows in the golden billows of the wheat fields.

The towering stature and spire-like erectness of the lordly pine can be attained only shoulder to shoulder with its brethern in the serried ranks of the dense forest. Alone it dare not brave the winds of heaven to half that height.

Nor is it solely between cells of the same plant or plants of the same species that relations of mutual advantage exist; it has been demonstrated of late that almost all the classes of higher plants depend for their very existence upon the existence of swarms of bacteria in the soil, which change the nitrogen of the soil, of the air, into ammonia and nitrates in which form alone it can be absorbed by the roots of grasses and herbs. Simply destroy the bacteria and moulds in any given patch of soil by heating it, and plants will refuse to grow in it. In most cases, of course, this relation is a mere geographical one, an accidental co-existence in the same soil-bed, but in others it is so definite and intimate that a term has been coined to express it—"symbiosis" or "mutualism."

Common clover, for instance, is largely dependent for its nourishment upon the abundance of tiny, apparently parasitic organisms which attach themselves to its rootlets, known as "root-knots," which absorb nitrogen from the air and elaborate it for the use of the plant. Hence its peculiar power, so highly prized by the farmer, of not only not impoverishing but actually enriching the soil in which it grows.

A similar service is rendered by the moulds which form upon the roots of oaks and ashes in certain soils.

In the plant-world, at least, there is no antagonism between "the higher life" and the lower; in fact, the former absolutely depends upon the latter. It would, of course, be absurd to claim that any feeling of affection or conscious purpose was present in or prompted these mutual relations among vegetable cells, but still it seems hard to imagine its occurring with such tremendous frequence and constancy without some blind instinct of combination, some dim sense of solidarity, on the part of one or both groups.

My main object in dwelling upon it is simply to call attention to the fact that combination is as essential and important a law of nature as antagonism, friendly co-operation as hostility.

"Live and let live" is as necessary a part of the struggle for existence as "war to the knife."

That when man loves he is but giving a name and conscious shape to impulses which have existed in the germ since shortly

after the earliest appearance of life on the planet. That love is to him as natural and necessary an emotion as hunger.

The first appearance and real birthplace of true love and conscious affection is to be found in the reproduction of the species. Around this process cluster alike its earliest memories and its noblest developments. From its earliest stages there is a curiously altruistic element about it, a subordination of the individual to the race.

The amœba who divides by simple fission is performing an act of immense importance to the race, but of little or no conceivable advantage to himself, unless he may have been driven to it in the first place as the only alternative of stagnation and death. Similarly the hydra, a little higher up in the scale, thrusts out its buds, apparently far more with reference to the colony, than to any advantaging of itself.

The process goes on, rising in type and increasing in complexity, through the anemone, the star-fish, the shell-fish, in the same blind instinctive manner, though with a rude dignity about it that separates it from all other vital processes, and it is not until we reach the point where the division of labor takes the majestic and far-reaching step of making two individuals necessary to its performance that we find any trace of conscious emotion or purpose concerned in it.

The appearance of sex, the development of maleness and femaleness was not only the birthplace of affection, the well-spring of all morality, but an enormous economic advantage to the race and an absolute necessity of progress.

In it first we find any conscious longing for or active impulse toward a fellow creature. Though big with great possibilities, it is yet as an impulse to conduct of the narrowest sort and apparently in many respects but little superior to the purely selfish or nutritive appetites. Another touch is needed before it becomes capable of development or of reaching any high or noble pitch.

And this is the appearance of offspring which need parental care.

The first appearance of reproduction, by fission or division, is

merely a forced solution of the problem of keeping up a sufficient proportion of absorbing surface to a given amount of bulk. Nature's stern *ultimatum* is, "Divide or die,"—and the amœba divides. But this is found to be a clumsy and expensive process, and an improvement is introduced by which the cell instead of cleaving to its very centre simply throws out buds from the surface, the buds become smaller and more numerous and ova are formed, and finally the process is divided between two separate cells, and sex is born.

For a long time sex appears to be little more than a mere economic device, a vital "division of labor" on the grounds of economy of expenditure and increase of efficiency. Indeed, this would appear to be its chief rôle not only in the plant-world, but through the whole Invertebrate Sub-kingdom with the exception of one great class, the Insects, and in the three lower classes of the Vertebrates. Yet even here its high character is shown by the wonderful beauty and complexity of the structures developed by it, as the colors and shapes of flowers and the incredibly elaborate mechanisms they possess to ensure fertilisation by insects; the rich tints and graceful contours of the luscious fruits, the priceless berry of the wheat and grain of the maize, the rainbow lustres of fishes. Even in those classes where it does not reach the level of parental affection, as in the crustaceans, the fishes, the reptiles, it is invariably associated with the highest development of strength and fighting-power in the males and of intelligence in the females, of which they are ever capable. The nocturnal journeyings of earth-worms, the pluck and determination displayed by fishes in their long and perilous annual migrations in search of a spawning place, stemming the fiercest currents, leaping the mill-weirs, forcing their way up the brooks where the water is scarcely deep enough to cover their backs, all that the next generation may have their start in life under the most favorable circumstances possible, are cases in point. And although the classic statement that "even an oyster may be crossed in love," must be regarded as a mere figure of speech without scientific foundation, yet his gastronomic associates, the lobster and the crawfish, are aroused from their usual lethargy

to a tremendous pitch of pugnacity and valor by the approach of the pairing season and undertake quite extensive migrations under the same influence, while the females of some of the highest forms of crustaceans appear to exercise even a small amount of maternal care, carrying the ova and newly hatched young on the under surface of their caudal appendages.

The same may be said of the fishes, the reptiles, and the amphibia, even the stupid and sluggish newt or salamander being galvanised into something resembling activity and intelligence by the approach of the breeding-season.

Let parental affection, however, appear, and a striking transformation begins. Intelligence not only of a degree, but of a kind unknown before is born. If this were confined to the mammalia alone, it might be regarded as a mere coincidence, and affection as merely one of the many properties of the higher forms of life: but the fact that this emotion produces identical results not only in a lower class of vertebrates, the birds, but in a class of invertebrate life, the insects, effectually negatives this claim.

Insects are in no way superior to the other classes of invertebrates in size, in vigor, or in nutritive power, indeed they are inferior to most of their fellows in these respects, and yet in two qualities alone, affection and intelligence, they reach as it were, at one bound, not only the head of their own sub-kingdom, but also a rank almost equal to that of the very highest forms of vertebrate life. And in nearly every instance this extraordinary intelligence is chiefly displayed in connexion with the reproduction of the species.

The *chef d'œuvre* of the wasp, the one thing that makes him famous, is his paper-like nest and comb, every angle of which is calculated with mathematical accuracy. But his ingenuity does not stop with the construction of this exquisite hexagonal cell and the safe deposition of the fertilised ovum at the bottom of it. The cell is built not only large enough for the adult larva but also for an abundant supply of food materials for his nourishment during his development. Moreover, the wasp is a carnivorous creature, and a supply of even freshly-killed, juicy caterpillars would putrify long

before the larva grows large enough to devour them, so the grubs are caught and instead of being killed are dexterously stung just behind the head, at precisely the required point to strike the chain of nerve-ganglia and *paralyse* them.

Thus they are incapable of either movement or further development, but will continue to live and hence "keep fresh" until master larva is ready to make use of them. Could human ingenuity go further? A refrigerator-car or can of corned beef is a clumsy device by the side of this.

Bees can boast not only of the triumph of the comb, so exquisitely constructed with a view to a maximum of strength and containing power with a minimum of material, that not even the most elaborate engineering calculations can improve upon it, and a strip of wax "foundation" an inch wide and four long and weighing a few grains can be expanded into a comb four inches square by two inches thick, containing over a pound of honey, but also of one of the most elaborate and yet elastic social and political organisations that the sun shines upon. A limited monarchy in which the rights of every citizen are firmly upheld.

And all this is directly for the preservation and perpetuation not of the individual but of the race. That other bees who are still in the egg may survive the coming winter, the earlier-born worker-bee literally and actually slaves herself to death, gathering honey, making comb, or elaborating bee-bread. The life-time of a worker-bee in the height of the season is often not more than three or four days. At the call of their queen they swarm forth in myriads to leave their comfortable hive and brave all dangers in starting a new colony to raise more broods. Their celebrated weapon, the sting, while of incalculable value for the protection of the community and its stores, is not only valueless but actually fatal to the individual, as death inevitably follows its use. Their most extraordinary achievement however is the power possessed by them, according to some authorities of actually determining the sex of the larva by the food upon which they feed it, thus literally "manufacturing" queens, drones, or workers, as the needs of the hive demand. A

power which places their intelligence not only on a level with ours, but distinctly above it.

Ever since the days of good King Solomon we have been exhorted to "go to the ant" as a model of industry and foresight, but these are only the smallest of the qualities in which even human beings would do well to take these wonderful insects as a pattern. Not only do they, as the proverb approvingly comments, build houses and store up food against rigors of winter, but they possess a social organisation so elaborate and advanced, that they have actually passed some of the standards, established by anthropologists, for the third stage of savagery or first of barbarism, namely: "The domestication of animals other than the dog." Several species of ants not only capture but literally domesticate a variety of the green plant-lice (*aphides*), "milking" them by stroking them with their antennæ until they yield their drop of honey-like secretion, building stables for them upon their favorite plants and changing them to fresh pastures from time to time as their needs demand. A regular dairy-farm, only with little green cows in place of the classic red ones. They build houses which rival our modern Chicago "sky-scrapers," ten, fifteen, and twenty stories in height, with halls, store-rooms, sleeping-chambers, corridors, warm southern galleries for nurseries, and royal apartments. They go out to war, in serried ranks, under the command of a single leader. They have laws which are rigidly enforced and whose penalties are promptly inflicted. All they lack is speech to render them well nigh our equals. As one of the closest observers of their habits, Krapotkine, asserts: "Mutual aid within the community, self-devotion grown into a habit and very often self-sacrifice for the common welfare are the rule. . . . And if the ant stands at the very top of the whole class of Insects for its intellectual capacities; if its courage is only equalled by the most courageous Vertebrates, and if its brain—to use Darwin's words—'is one of the most marvellous atoms of matter in the world, perhaps more so than the brain of man,' is it not due to the fact that mutual aid has entirely taken the place of mutual struggle in the communities of ants?" There is just one function around which all the activities of this

wonderful people centre: which is alike the motive and the goal of all their efforts, the care of the coming generation. For them the finest and most spacious galleries facing to the South and warmed by the sun are built and reserved, for them the honey-dew of the aphis is collected, for their production and protection the whole elaborate community is organised, for them the battle is fought to the death.

Break open an ant-hill and you will find at once that the first thought of the entire startled community is to save not themselves, but the eggs and larvæ; the warriors rushing bravely forth to discover and attack the enemy, while the nurses, seizing each her charge in her mandibles with an utter disregard for their own lives, rush wildly hither and thither in search of some place of safety where they may deposit their precious burden. In a wonderfully short space of time every egg has been carried into some of the uninjured galleries; the opening hastily blocked with little pellets of earth, the warriors are recalled, unless they have, much to your sorrow, succeeded in finding your ankles in the meantime, and the work of the community which was so rudely interrupted goes on once more. The one thing that lifts the ants, the bees, the wasps head and shoulders above all their fellows is the love they bear to their offspring. Wherever in the wide world of organic life love is found, there also are found its devoted servants, courage and intelligence. The higher we rise in the scale, the more prominent does this factor become.

The thing which most distinguishes that living, vocal sunbeam, the bird, is his warm affection first for his mate, and secondly for his nestlings.

To the first he owes his matchless hues and exquisite shadings from the liquid-fire of the humming-bird's throat to the soft silvery sheen of the turtle-dove's breast, or the under-wing of the plover. To this also he owes his wonderful gift of song which rises as far above human speech in its power to express emotion as it falls below it in its ability to convey ideas. No one, I think, can listen to the burst of glad-throated melody which greets the sunrise in May, from every copse, without feeling that the soul of the bird comes

nearer the soul of man than that of any other of the innumerable forms of life: nay, that in love and worship it rises far above it. And every shred of color, every line of pencilling, every note of melody owes its being to the graceful rivalries of courtship, in Philistine phrase, to sexual selection. They are of no possible benefit to his nutrition as an individual: on the contrary, they serve both to warn his prey and to render him conspicuous to his enemies. They actually mean fewer butterflies and more breathless chases, but he needs them in his little *affaires de coeur*, and behold, they are developed and become his chief glory and only claim to distinction.

And with the appearance of the offspring what an immense amount of skill and craft and intelligence must be developed: first there is the building of the nest, a pyramid of Cheops in itself which must accurately match the bark of the old apple tree, in whose fork it is built, like the chaffinch's, or swing from the wind-tossed tip of a bough beyond the reach of the craftiest snake or most active monkey, like the oriole's, or be slung up under the eaves like a swallow's, or woven so that it will float in a freshet like a waterhen's, or stitched on the under side of a leaf, "as the fern seed, invisible," like the humming-bird's, or built in the centre of a *chevaux de frise* of thorns like the shrike's. No sooner is this finished and the eggs laid than the period of hatching begins, and what a tremendous developer this is of patience and courage in the female and energy and foraging-skill in the male. With the appearance of the young all the aggressiveness and resources of both parents are strained to the utmost, everything that comes near the nest must be attacked, and fresh food is demanded every hour of the day.

Then there is the training of the little ones to fly and the watchful guarding of their first flutters, the brave attacks of the father upon every foe that approaches, or the skilful feints of the mother as screaming and fluttering with drooping wing and limping gait she lures the foe to pursue her and leave her offspring to escape or hide themselves.

Bird-beauty, bird-music, and bird-intelligence have one com-

mon root, the nest. Later on they are used for more extensive combinations: groups, flocks, colonies are formed for migration, for protection, nay even for combined attack and defence.

Little groups of king-birds will attack and fiercely pursue hawks, wagtails will positively persecute sparrow-hawks, even tiny swallows will surround and by sheer force of numbers and aggressiveness overwhelm and chase away a falcon, if it dares to come near their nest-colony. A mere "passel o' sparrers" will take a positive delight in making the life of any owl, that they can discover in the day-time, a burden to him. Water-fowl upon the shores of lakes will combine to attack and drive off falcons, ospreys and even the eagle himself. Through mutual aid and mutual affection, "the meek" literally have "inherited the earth."

But it is when we reach the highest class of all, the Mammalia or "breast"-animals, that this close relation between affection and progress becomes most striking.

At the very outset of his consideration of this aspect of the struggle for existence Darwin remarks in his clear, simple, almost matter-of-fact style, "the individuals which took the greatest pleasure in society would best escape various dangers; while those who cared least for their comrades and lived solitary would perish in greater numbers." And this thought, though sadly overlooked or even shamefully misrepresented by many of his so-called followers, is of late being emphasised as it deserves. One of our highest authorities upon the social life of animals, Krapotkine, declares that "Life in societies is no exception in the animal world. It is the rule, *the law of nature*, and it reaches its fullest development with the higher vertebrates. Those species which live solitary or in small families only are relatively few and their numbers are limited. Life in societies enables the feeblest mammals to resist, to protect themselves from the most terrible birds and beasts of prey; it permits longevity; it enables the species to rear its progeny with the least waste of energy and to maintain its numbers, albeit with a very slow birth-rate. . . .

"Therefore while fully admitting that force, swiftness, etc. . . . are qualities making the individual the fittest under certain circum-

stances, *we maintain that under any circumstances sociability is the greatest advantage in the struggle for life.* . . . The fittest are thus the most sociable animals, and sociability appears as *the chief factor in evolution* both directly by securing the well-being of the species while diminishing the waste of energy, and indirectly by *favoring the growth of intelligence.* . . .[1]

"Therefore combine, practice mutual aid. That is the surest means of giving to each and to all the greatest safety, the best guarantee of existence and progress—bodily, intellectual, moral. That is what nature teaches us."

The same thought is vigorously advanced by the brilliant young biologist, Arthur Thomson, who says: "But animals are social not only because they love one another, but because sociality is justified of her children. The world is the abode of the strong, but it is also the home of the loving."

The attitude of most popular and many scientific writers towards these "higher" qualities of ours is truly singular. Utterly useless or actually injurious to self-advancement, they have come into being somehow by chance and are a sort of dangerous and expensive biological luxury, which man and the higher mammals can afford to indulge in, solely by virtue of their superior strength and intelligence. Social instincts and relations have sprung up, not as a means of waging more successfully the struggle for existence but as a means of escaping from it, and we are gravely warned by some "evolutionist" philosophers that we must not allow our sympathies for our fellows too much sway over our conduct, lest we should "promote the survival of the unfit"! And all the while it is these very sympathies which are both the foundation and mainspring of our present "fitness" and civilisation, while love is the very creator of our strength and intelligence instead of their spoiled darling. In the great group of mammals the same rule holds as in birds and insects, that whatever species or families are solitary and unsocial in habits, form no communities and few or brief family ties and give birth to few offspring at a time and

[1] The italics are ours.

these requiring but little care, are almost invariably either of a low grade of development, stupid and cowardly, like the sloth, the armadillo, the ant-eater, and the mole, or else ferocious, capable of little modification, and of a sometimes keen but markedly limited intelligence, like the cat, the panther, the wolverine, and the otter. If we were to divide the group into three great classes, those who care little for their offspring, or mate for a brief period only, those who are devoted to offspring and mate but indifferent to all others of their species, and those who cherish not only their immediate family but also the members of their pack, flock, or community, we should find almost every species of any notable degree of intelligence in the last class. And while certain members of the second class, such as the great cats and the bears, are as individuals among the most formidable and dangerous of the entire sub-kingdom (although the gorilla, the water-buffalo, and the wild stallion can meet any of them on equal terms), yet they can never become half so numerous in a given area as those of their own family who form packs for mutual assistance, nor do they resist extermination as long. And even the tiger will snarlingly relinquish his kill to the dhole- (wild dog) phalanx, while the huge grizzly has to often give the right of way to the wolf-pack, and the jaguar to the peccary-herd. Fierce and powerful as are the tiger, the panther, and the grizzly bear, they are seldom half such a serious and obstinate obstacle to spread of civilisation or so dreaded by settlers in a new country as the far feebler wolf, with his pack-forming power. On the other hand, scarcely a single mammal has been found worthy either physically or mentally of domestication by man, excepting the cat, which is not social to a high degree.

We are apt, I think, to forget what a vitally important and incessantly acting factor in the survival of all our larger mammals, outside of the pure flesh-eaters, this mutual aid is. The moment, so to speak, an animal gets big enough to be readily visible from some distance in the open, it must either confine itself to thickets, swamps, and mountain-ledges, or combine with its fellows for mutual defence. This combining would appear to be associated more closely than with any other single factor with the lengthening of

the time required for reaching maturity on the part of the young. Most carnivora are for practical purposes of either escape or defence mature at from six to ten months, while most hoofed animals take from two to five years for full development.

This naturally increases the duration of parental care and the size and complexity of the family, which, aided by the polygamous instincts of the male, becomes the nucleus of a rapidly forming herd. The larger and more complex the latter becomes, and the greater the intelligence required to maintain concerted action and keep in touch with the entire mass, while under the protection of numbers relieved from the necessity of rapid and frequent flight, the size and vigor of the body steadily increases until the species becomes almost impregnable against the attack of any carnivorous species, save and except the fiercest and most dangerous of all, man, as was the case with the buffalo of our Western plains. The daily and hourly exercise of first, affection, then intelligent sympathy, and finally courageous devotion is absolutely necessary to existence. Even an animal so apparently little gifted in other respects as the cow displays some remarkable qualities in this regard. The hardiest Texan ranger is extremely chary of handling or even alarming a young calf, lest it should "blart" out its danger-cry, for the whole herd goes simply mad with rage at once and will attack anything that comes in their way. Such is the watchful care extended over these little ones that in the spring when they first begin to arrive and like their scarcely more chubby human counterparts need to sleep most of their time and are quite incapable of following their mothers over the considerable area which must be covered every day in grazing, regular *crêches* are established for them on the sunniest slope of the grazing valley, where they are guarded by three or four of the sharpest-horned old Amazons of the herd, while their mothers graze at ease till meal-time comes. One of the prettiest sights upon the great cattle-ranges is to suddenly come upon a group of ten or a dozen of these little red-and-white breathing puff-balls, fast asleep in the grass, with their vicious-looking guards patrolling near them, the herd grazing in the distance and a couple of hungry coyotes gazing wistfully down from

the top of the next range of hills, hoping that *something* may happen to distract the attention of the guards for a minute or two. But the flaw in this bravery and vigilance lies in its occasional inconstancy. In horned cattle fits of rage are apt to alternate with equally furious and unreasoning fits of panic, and though the cow will protect her sucking calf under all circumstances, in the mad stampede many a weanling and yearling falls behind the herd and is pulled down by the hereditary foe. It is to our noblest friend, the horse, that we must turn for the perfection of mutual aid and civic courage.

When the alarm is sounded by the sentinel of the herd, the horses and mares rush not away from the danger but towards one another and rapidly form a compact mob in the centre of the valley. The colts and yearlings are pushed into the centre while the adults form a firm ring round them, facing outward, so that whether the snarling and disappointed pack of the gray devils of the plains attack the regiment in front, flank, or rear, or all three at once, they find themselves everywhere confronted by an unbroken rank of snapping yellow ivories and dancing iron hoofs, driven with the force of trip-hammers, any attack upon which will only result in a mouthful of their own teeth or a broken skull. It is the "human wall" of Sempach, the hollow square of Waterloo, in its original form and like them it can defy any foe short of the bullet. Should a mare or colt be surrounded by the wolves before they can join the regiment, the latter moves swiftly but steadily to their assistance led by its war-chief, the oldest and ruling stallion of the herd. He alone takes no part in the formation of the circle, but trots proudly out from it in the direction of the threatened attack and woe betide the wolf who ventures near enough to be overtaken before he can regain the broken ground of the nearest foot-hills. It is short shrift and no quarter for him, and not only the big, gray timber-wolf of our Northern plains, but even the jaguar of the pampas, have been slain in single combat by the war-lord of the horse-herd in defence of his mares and colts.

All these faculties are of course developed in a state of nature, and perhaps better exemplified in this condition. Indeed it is the

training which this mutual co-operation has given, and alone could give, to their intelligence which has rendered them capable of such valuable co-operation with man in his progress. There can be but little question, but that the horse transfers or extends to man the sentiments which he originally felt toward the herd, while the dog simply regards man as at least a member and possibly as a sort of deified embodiment of the pack. Hence the touching fidelity and self-sacrificing devotion, of which both these noble friends of ours are capable, the mere mention of which is enough to call up in most of us the warmest and most grateful recollections. There is no need to multiply instances, poets have sung and philosophers have sounded their praises in all ages, and here the relation between affection and other high qualities is still preserved, for it is almost invariably the most loving who are the most intelligent and the most courageous.

Moreover those animals, or breeds of them, that are kept most constantly upon terms of affectionate intimacy with their older brethren of the human species, are those which are most distinguished for courage, beauty, and intelligence. There is nothing peculiarly favorable to the development of the horse in the climate, soil, or vegetation of Arabia ; much indeed that is unfavorable. But here, almost alone in the world, the horse has been made a member of the human family, sheltered under their tents, fed from their dishes, fondled, wept over, nay, almost prayed to in times of peril, and the result has been not a spoiled and effeminate plaything, but the noblest joint-product of man and nature—a creature with the swiftness of the falcon, the beauty of the gazelle, and the courage of the lion, who will gallop till he drops, with no other spur than the mere touch of his master's hand. If the wild Bedaween of the desert had never produced anything but the Arab horse, that alone would have earned them the gratitude of the human race. It is simply astonishing to what extent every breed of the horse, which has achieved a reputation outside of its own native province, owes its best qualities to the mixture of his wonderful blood. Either directly or through his descendant, the English thoroughbred, he has left his mark all over the civilised world. The winner of the Derby

or St. Leger, the American trotter, the spirited Barb, the Australian Waler, the plucky and wiry broncho of our western plains, all alike are proud to trace their pedigree back to him, and wherever his blood is found, it still carries with it not only speed, beauty, and endurance, but what ranks almost higher yet, absolute devotion and indomitable courage. Wherever man is called upon to risk his neck, to trust his life to his horse, whether in battle, in the hunting-field, or upon the badger-riddled cattle ranges, the Arab blood is his first choice. As a shrewd old Yorkshire horse-dealer once expressed it to the writer, "Your thoroughbred, sir, has always got a leg left, no matter how nasty a place ye gets him into, and he'll save your neck at the risk of his own."

The same is true of the dog, those breeds or individuals which are most distinguished for intelligence and courage being almost invariably those that are kept in or about the house, as trusted members of the family. Dogs which are kept in packs or kennels are usually distinctly inferior in intelligence and generally in courage. One of our most celebrated trainers gave it, as the secret of his success, that he got his dogs to "associate with him just as closely as possible." This is so generally recognised by dog fanciers that there is decided prejudice against "kennel-bred" dogs, who have been reared as it were by wholesale, usually with a number of others, fed by an attendant, and have had but little opportunity of getting attached to anybody. In fact, fully half of the justly vaunted intelligence of the dog depends upon the intimacy of his association with and affection for some man.

Nor is this interdependence between the civil virtues and intelligence, by any means limited to domestic animals. The wonderful architectural achievements of the beaver have their origin in the closeness of his social ties. The remarkable sagacity of the wild elephant is matched by the firmness of his social organisation while the baboon who is able to use sticks, stones, and thorns as weapons in his warfare or as implements in his food-getting and whose general intelligence is so great, that it is declared by the natives that he knows how to talk, but won't for fear he should be put to work, is equally remarkable for his co-operative powers, moving

to the attack or plunder in regularly-organised bands which obey a leader and post sentinels. These latter are not only heeded instantly, when they give the alarm, but several instances are recorded where they have apparently been tried and punished with death for failure to warn the band of danger. When retreating before a victorious enemy, if one of their number is intercepted or captured his comrades will rush to his rescue, or failing this, the leader has been known to return to his assistance single-handed.

And the case is even stronger when we come to the highest species of all. The most striking and influential characteristic of every tribe of the lowest degree of civilisation is its Ishmaelitish attitude—its hand against every man, and every man's hand against it. The thing that makes the Bushman, the Akka, the Tierra del Fuegian a savage and keeps him so, is not his lack of intelligence, for of this he possesses often a larger share than some of his brethren much higher in the scale. It is not the unfavorable nature of his climate or environment, nor the absence of animals suitable for domestication, but it is simply his inability or unwillingness to trust, not merely the members of other tribes, but the members of his own tribe, nay, the members of his own family sufficiently to co-operate with them in any way. Indeed, the short-livedness and fickleness of his kindly impulses may even prevent him from keeping and caring for any animal long enough to domesticate it, thus debarring him from taking the first step upward in the social scale. Kipling, in one of those wonderful flashes of insight into the very heart of things, which so often illuminate his pages has epitomised this attitude as that of "the desert where there is always war."

The frightful indifference of the savage to human death and suffering, not merely in respect to his enemies, but also in his own tribe, which leads him to squabble and fight to the death over the merest trifle, to kill the aged in times of scarcity, to systematically practise infanticide, and even to kill all who are seriously wounded after a battle or who appear unlikely to recover from illness, is by far the most powerful and fatal obstacle to his progress.

In the first place, this terrific waste of life, at every pore, as it were, keeps the tribe small and weak and absolutely prevents that

pressure upon each other and upon the means of subsistence which, as we shall show in another article, is the chief stimulus to industrial progress. In the second place, individual life is rendered so short and so uncertain, that absolutely all the energies of man are devoted to its mere preservation, with no time to spare for increasing its fulness or comfort. Thirdly, it can be convincingly shown that all those powerful influences for elevation, known as the natural sciences, botany, chemistry, astronomy, etc., had their origin to a large degree, in what could be broadly termed "medicine" and came into being very largely through that effort to preserve the helpless, protect the weak, and restore the sick, which this unsocial spirit so emphatically antagonises. And last but not least, this attitude of distrust and hatred absolutely prevents that co-operation, that division of labor, without which no substantial progress is possible. In so far as he hates, the savage is a savage, and will remain so. Whenever he begins to love he begins his upward progress toward civilisation at once.

In the lowest stages even the family tie was so loose as to furnish but little foundation for the formation of even the smallest group which could be united by mutual confidence and affection. Just as soon, however, as this becomes more stable, a small but wonderfully effective band is formed to serve as a nucleus for further development. The mother of course will always protect and befriend her child, but it is not until the father begins to take an active participation in the process that anything like a permanent group can be formed. So soon as this begins it is obvious that the father who protects his children most vigilantly in times of danger and watches over them most carefully in times of sickness, who shares his last portion with them in famine, will soon collect around him a larger and more effective family group than that of his more indifferent neighbors, and the advantages of "a family of tall sons" are still sung and recognised in every primitive community from our present Western frontier back to the times of Joshua.

The family group which follows out this line of conduct most persistently would reap cumulative beneficial effects with each coming generation. By this time it will have become large enough,

not only effectively to protect itself from the smaller groups by which it was surrounded, but also to be regarded by outsiders as a desirable body to become connected with by marriage, or in some other way. This would soon give it a pre-eminence in the tribe to such an extent, that its principle of conduct would become a rule for the majority of its tribal connexion, and this again, of course, would result in a still wider spread of mutual confidence and the possibilities of and practice in intelligent co-operation. Thus the living snow-ball would grow as it rolled, until the principle of co-operation having become instinctive in its members not only as regards all members of the family, of the clan, and the tribe, the same spirit would reach out towards some of its neighboring tribes and a confederation would be formed.

By this time the tribe would have grown in mass and in wealth, to such a degree that division of labor would not only have become possible but absolutely necessary. Animals would have been domesticated, weapons would be made by one man, clothing by another, ornaments by another; some rude knowledge of the medical virtues of plants and mineral earths would have been obtained, cookery would have made some progress, resulting in the possession of pottery and other utensils—and behold, the community is no longer savage, but has reached the next stage, that of barbarism. The same cohesiveness, which has made them strong for defence, has also made them powerful for attack and the conquest of neighboring tribes; or the occupation of new territories can now be attempted. This, by throwing upon them new demands both of climate, of methods of warfare, methods of agriculture, the necessity of overcoming rivers, mountains, swamps, and other natural obstacles, will stimulate the growth of the mechanical arts in every way, and the confederacy will rise rapidly in the scale. But even yet it is necessary that this same tolerant temper continue to be manifested. If its career is merely one of invasion and plunder or of extermination, its spread, though it may be brilliant, will be of but short duration, like that of the Huns and the Turks. But if, however, its treatment of conquered peoples is fair and honorable and they are given something of the rights and privileges which its

own members so dearly prize, then the confederacy will rapidly fuse itself into a nation; its progress will not be merely geographical but political, and its tides will swell toward the highest goal of national progress.

Even having reached this stage, no matter how great and powerful the nation may be, so long as it fails to accord to the subjects of other nations the same substantial rights and privileges which it cherishes so zealously for its own citizens, it cannot be regarded, in the full sense of the term, as civilised. Even to-day the most practical and striking division, between the civilised and uncivilised nations of the globe, is made by the test-question as to whether another nation can afford to permit her citizens to be tried anywhere, unreservedly, in its courts of law. Only a few years ago, for instance, this question was being seriously debated by the European powers in regard to Japan. The hope of all of us is, that that day is not far distant when this confidence in and affection for our brother man shall have spread throughout a still wider circle, so that not merely may individuals group themselves into families, families into clans, clans into tribes, tribes into confederations, and confederations into nations, but that the great nations of the world may group themselves together into a vast confederation of humanity, all of whose members shall be both fellow-citizens and brethren. Instead of being a mere episode in the march of civilisation, least of all opposed to its dominant factors, affection, with the confidence which is begotten of it alone, has been the very key-note of the process. And while the ties of blood and a pardonable pride of family may perhaps bias my judgment, yet it does seem to me, that the one thing which more than any other has been at the bottom of the wonderful colonising and empire-forming feats of the Anglo-Saxon, whether of Lesser or Greater England, has been his deep-rooted tendency toward fair, honorable, and even kindly treatment of the weaker races, with whom he has come in contact during his spread. Stern and unsympathetic he has often been, selfish and covetous of land or gold, but it has seldom been that an appeal to the inherent principles of human rights, a plea for justice, has fallen upon his ears unheeded. Although not always loved, he is invariably trusted by all with whom he comes in contact, even those who have most bravely and bitterly fought against him.

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CAUSATION, PHYSICAL AND METAPHYSICAL

WE LIVE in a world where effect follows cause in an orderly and, it would seem, inevitable rhythm. It matters not where we tap the fount of scientific inspiration, we always find that the untiring search for the antecedents of any event is founded on the conviction that for that event there is some ascertainable cause. Even chance has yielded to the statistical method, so that its laws may be formulated. By dealing with larger and larger numbers we eliminate more and more the idiosyncrasies of the particular case. And thus we come to realise that what we call chance in the tossing of a coin is only our ignorance of the nature and immediate cause of these idiosyncrasies. Just in so far as our science or its application is imperfect, do we project upon the screen of nature, woven by our experience, the shadow of fortuity, blurring the details of processes which, to less imperfect mental vision, would stand out clearly as causally related. Thus it arises that, for those who have been led to this point of view, the doctrine of evolution, as applicable throughout the range of an experience which science indefinitely prolongs, gives expression to the daily strengthening belief that the state of matters at any given moment is the outcome of a state of matters in the preceding moment, and in like manner serves to determine the state of matters in the moment that follows.

It may be said, however, that what I have spoken of as chance was, with inferior knowledge perhaps but with greater reverence, regarded by our forefathers as a direct action of the Power that lies behind the fleeting phenomena of the material universe. All that modern science has done, it will be urged, is to bring into stronger

and stronger relief the fact that the nature of this Power is without variableness or shadow of turning. Science thus shows behind the multiplicity of phenomena the unity of the causal power. How far and in what sense this is true, it is the object of the present essay to discuss.

In my former essay on "The Realities of Experience"[1] I have endeavored to prepare the way for this discussion. It was there shown that both the physical and the psychological sciences deal with data afforded by experience; that the incontrovertible dictum on which they take their stand is *experientia est*, that the phenomena of the world, which through experience we construct, have a practical reality on which we may rely with implicit confidence; but that the sciences which take their stand on experience have no right to proceed a single step—to assert anything positive or negative—beyond that which is given in experience or securely founded thereon. I even ventured to say that in presence of the problems of causation, science is smitten with the dumbness of agnosticism; adding, however, that behind the realities of experience I, for one, believe in a causal reality which makes that experience possible and explicable.

Now, what in the name of reason is the meaning of these astounding contradictions? Almost in the same breath we are told that science has established the all-embracing sway of natural causation; and that science can tell us nothing whatever about this (or is it some other?) causation, in which we are none the less solemnly invited to believe! If the reader deem the matter worthy of his serious attention, he will not be unwilling to look into it somewhat carefully.

Glanvill in his *Scepsis Scientifica* says: "All knowledge of causes is deductive; for we know of none by simple intuition, but through the mediation of their effects. So that we cannot conclude anything to be the cause of another but from its continual[ly] accompanying it; for the causality itself is insensible." "What we call experience," said Hobbes, "is nothing else but remembrance of what

[1] *Monist*, October, 1897.

antecedents have been followed by what consequents." Such statements as these, which are quoted by Lewes, may have been the seeds which germinated in the mind of Hume and developed into his well-known theory of causation. In any case it is evident that he thought the matter out for himself with his customary vigor and independence. We may profitably make his treatment of the subject our starting point.

"When we look about us towards external objects, and consider the operation of causes," said Hume in that section of the *Enquiry* which treats of the Idea of Necessary Connexion, "we are never able in a single instance to discover any power or necessary connexion, any quality, which binds the effect to the cause, and renders the one an infallible consequence of the other. We only find, that the one does actually, in fact, follow the other. The impulse of one billiard-ball is attended with motion in the second. This is the whole that appears to the outward senses. The mind feels no sentiment or inward impression from this succession of objects. Consequently there is not, in any single, particular instance of cause and effect, anything which can suggest the idea of power or necessary connexion."

For a comprehension of Hume's conception stress must be laid, in this passage, on the words "in a single instance." When he says that we are never able *in a single instance* to discover any power or necessary connexion, these four words are not merely inserted to emphasise the *never;* they are to be taken literally. We are never able, from the study of a single and isolated case or example, to discover any power or necessary connexion. This appears more evidently in later passages.

"When any natural object or event is presented, 'tis impossible for us, by any sagacity or penetration, to discover, or even conjecture, without experience, what event will result from it, or to carry our foresight beyond that object, which is immediately present to the memory or senses. Even after one instance or experiment, when we have observed a particular event to follow upon another, we are not entitled to form a general rule, or foretell what will happen in like cases; it being justly esteemed an unpardonable temerity to judge of the whole course of nature from one single experiment, however accurate or certain. But when one particular species of event has always, in all instances, been conjoined with another, we make no longer any scruple to foretell the one upon appearance of the other, and to employ that reasoning, which can alone assure us of any matter of fact or existence. We then call the one object, *Cause;* and the other *Effect.* We suppose that there is some connexion between them; some power in the one, by which it infallibly

produces the other, and operates with the greatest certainty and strongest necessity.

"It appears, then, that this idea of a necessary connexion amongst events arises from a number of similar instances, which occur, of the constant conjunction of these events; nor can that idea ever be suggested by any one of these instances, surveyed in all possible lights and positions. But there is nothing in a number of instances, different from every single instance, which is supposed to be exactly similar; except only, that after a repetition of similar instances, the mind is carried by habit, upon the appearance of the one event, to expect its usual attendant, and to believe, that it will exist. This connexion, therefore, which we *feel* in the mind, or customary transition of the imagination from one object to its usual attendant, is the sentiment or impression, from which we form the idea of power or necessary connexion. . . . The first time a man saw communication of motion by impulse, as by the shock of two billiard balls, he could not pronounce that the one event was *connected;* but only that it was *conjoined* with the other. After he has observed several instances of this nature, he then pronounces them to be *connected*. What alteration has happened to give rise to this new idea of *connexion?* Nothing but that he now feels these events to be connected in his imagination, and can readily foretell the existence of the one from the appearance of the other. . . . When many uniform instances appear, and the same object is always followed by the same event; we then begin to entertain the notion of cause or connexion."

The first question we may ask concerning the views which are thus so clearly and forcibly expressed is this: Does Hume disclose anything beyond observable or frequently observed succession? Obviously not. Let us take a matter of common experience. The flash and the report of a distant cannon are so connected in experience that the occurrence of the one suggests the other through association. In Hume's interpretation, first, the visible flash is the antecedent of the heard report; secondly, the flash is the antecedent of an expectation or anticipation of the report; and thirdly, custom is the antecedent condition of the settled and established anticipation. Here we are simply describing certain facts of experience in terms of antecedence and sequence. Of any "power" or "strongest necessity" Hume should be, and I take it actually was, the last to see in mere custom the smallest indication. To modify the words of Hobbes without altering his meaning we may say: "What we call custom is nothing else but remembering what antecedents have been followed by what consequents"; and we may

add in the phrase of Glanvill "for the causality itself is insensible."

A second question may be put thus: Is anything gained by shifting the field of discussion from the physical to the psychological aspect of one common experience? Otherwise stated: Is there any advantage in dealing with the sequence, seen-flash—expectation-of-the-report, instead of with the frankly objective sequence, flash—report. In some respects there would seem to be a distinct disadvantage. For though in the subjective scheme on which we interpret experience the flash and the report stand in the relation of antecedent and sequent, in the objective scheme on which we interpret experience they do not stand in this relation. For experience itself discloses the fact that if we lessen our distance from the cannon the interval between the antecedent flash and sequent report is proportionally lessened. The two converge in time as we approach the cannon. Carrying this convergence to its ideal limit in the objective sphere, the two coalesce, and antecedence vanishes, at the cannon's mouth. Hence, in the objective interpretation of experience by physical science, the flash is not the antecedent or cause of the report. They are the diverse effects of an antecedent common to both. Of course there is no lasting and abiding discrepancy between the psychological and the physical interpretation of experience, in a scheme of knowledge that is adequately organised and correlated. But the fact that such organisation and correlation is necessary, should warn us against any limitation of the discussion of causation to the subjective sphere of impressions and expectations. It need hardly be said that this does not imply any forgetfulness of the fact that there is a subjective aspect in all experience, and in every stage of its interpretation. This we may now take for granted; and we may say that experience, whether we regard it objectively or subjectively, affords certain observable sequences which in any consistent interpretation must be duly correlated. We thus come back to what may be regarded as Hume's primary contention which may be thus summarised. All that is disclosed in the objective treatment of experience may be expressed in terms of actually observed antecedence and

sequence. "The scenes of the universe are continually shifting, and one object follows another in uninterrupted succession; but the power or force, which actuates the whole machine, is entirely concealed from us, and never discovers itself in any of the sensible qualities of body."

And so we may pass on to our third question. Is this way of regarding causation accepted by modern science? But in order to lead up to an answer to this question we must consider briefly in what respects the conceptions of science differ from the raw material of sensory experience.

It is clear that the conceptions of science are mental products. They form part of an ideal scheme, often highly abstract and generalised, by which we interpret the phenomena of our sensory experience. The law of gravitation is an abstract and general formula applicable to any one of the thousands of particular cases of gravitative attraction which may at any time, and in any part of the universe, be presented to our observation. The law that the tide-producing influence of any celestial body varies directly as its mass and inversely as the cube of its distance from the Earth, is a formula which results from a consideration of the differential effects of gravitative attraction on a body which is in part rigid and in part mobile. That such abstract formulæ and general schemes for the interpretation of a multiplicity of particular cases, are what we may term "constructs" of the human mind, needs no further illustration. But it is obvious that our treatment of experience in the foregoing essay precludes our saying that, save in their abstract and general nature, the constructs of science differ in any essential aspect from the constructs of sensory experience. For the latter no less than the former are mental products; and they are constructs in so far as the immediate data of sense are supplemented by the associated products of past experience revived in memory. A subtle and characteristic scent leads me to construct violets; a sound in the street leads me to construct tram-car; the sight of distant specks of grey on the swelling chalk downs leads me to construct sheep; and so on in a thousand familiar cases. This whole range of our sensory experience is a mental product; and every object

therein is a construct, or, as Dr. Johnstone Stoney terms it, a *syntheton*, of which sense supplies the nucleus and memory fills in the rest.

Shall we then discover a distinction in the fact that the constructs of sense have an objective reality which is lacking to the more abstract and general constructs of science? That depends on how we define the term objective, and on what we understand by reality. Subject and object are, in our interpretation, products of the analysis of experience. Both are implicit in every definite item of human experience; both may be rendered explicit in thought as distinguishable but inseparable. Now if we limit the term "objective" to one aspect of this *sensory* experience then it will follow that, by definition, the constructs of sense have an "objective" reality which is lacking to the constructs of science. But such a limitation is arbitrary and leads rather to confusion than to clearness of ideas. We commonly speak of objects of thought, objects of desire, objects of reverence, and so forth. It is more consistent and more helpful to regard all experience, sensory and supersensory alike, as susceptible of analysis into an objective aspect and a subjective aspect. In which case the conceptions which form the constructs of science constitute, from the appropriate standpoint of analysis, an objective scheme which we, so to speak, project on to the screen of the phenomenal universe.

As to the reality of the constructs of science, that is their inalienable right as products of the widened experience of rational beings. *Experientia est.* To say that they *are* products implies that they are real products in the sense I endeavored to make clear in my former essay. But if the word "real" be used, as it often is, as the equivalent of "valid," then we may say that the constructs of science are valid just in so far as they fulfil their purpose of enabling us to interpret the particular phenomena to which they are applicable. The ideal scheme of science must fit the facts whenever and by whomsoever it may be applied as a canon of interpretation. If the scheme fits, under all possible circumstances within the sphere of its appropriate application, it is as real and

valid as anything within the range of human experience can possibly be,

It is therefore not in any lack of reality or of objective import that the constructs of science differ from the constructs of sensory experience. It is their abstract and general character which alone distinguishes them. We may add, however, that there is another feature about them which Dr. Karl Pearson well expresses by saying that they have been carried in thought to their ideal limits. Take the law of gravitation for example. It is sometimes asked, by what right we assume from a limited number of observations—very numerous perhaps but still limited—that the law is universal; and, further, by what right we assume from measurements limited in accuracy—very accurate, no doubt, but still falling short of that which is absolute—that in no particular case is there any variation, even by so much as a hair's breadth, from the formula which Newton expressed in mathematical terms. The answer is that we carry our law to an ideal limit unattainable by sense and by practical measurement. We assume that it is absolutely and universally true because in no case has it been shown to be actually and observably false. We sweep our ideal curve through the recorded data of physical measurement and regard the minute deviations of the actual from the ideal as due to errors of observation. We trust to a reality of thought which we believe to be truer and wider than the realities of sense.

Thus we use the conceptual constructs of science, carried in this way to their ideal limits and rendered absolute for thought, to explain the phenomena presented to our observation in the field of sense. But here we must pause again for a moment and render clear the meaning which attaches to the word "explanation." What, it may be asked, is the law of gravitative attraction, but a highly general and abstract *description* of certain facts and phenomena stripped of merely incidental errors of observation? Given certain antecedent conditions, certain consequent events follow. That is all. There is no explanation, not even an attempt at explanation, which shall afford an answer to the question why they should thus follow. Your law, it will be said, presents us with the *how* of gravi-

tative attraction in convenient schematic form. It tells us nothing of the *why*. If a boy asks why a stone falls to the earth, you do not reply: Because of the law of gravitation. Or if you do, he will, if a tolerably sharp lad, make answer: But I understood you to say that the law is an ideal construct to enable us to interpret the facts, whereas now you seem to tell me that it somehow constrains the stone to move toward the earth!

The truth is that the word "explanation" is used in two senses; in what we may term the scientific sense and in the metaphysical sense. When we refer a given fact of observation to the general law under which it falls, we are said to give a scientific explanation of the fact. Thus we explain the magnifying power of a pocket lens by bringing the particular phenomena under the general laws of refraction. We explain the easting of the trade winds in terms of the differential velocity, under rotation, of the tropical and equatorial zones. We explain the formation of hoar frost by showing that, when the dew-point is below the freezing point, water-vapor condenses in the form of crystalline needles of ice. In a word, the explanation, in this sense of the term, exhibits the relations of particular phenomena to the abstract constructs of science. Hence the fall of a stone to the earth is explained by referring it to the law of gravitation. But in none of the cases above adduced, which may be taken as sufficiently typical examples, is there any explanation in the metaphysical sense. In no case are they referred to an ultimate underlying Cause. The constructs of sensory experience are accepted as data; the constructs of science are built upon them in conceptional synthesis; the ideal scheme is repeatedly applied to phenomena for purposes of interpretation; observed facts are again and again referred to the ideal scheme for scientific explanation. But why the facts and the sensory data are what they are and as they are, is a question for metaphysics, not for science. If an answer to this question can be given, it will be an explanation in the metaphysical sense.

The observable sequences of natural phenomena as given in practical experience may here be distinguished from the inevitable sequiturs of logical thought. Of the former we can only say (apart

from some metaphysical explanation) that they are; of the latter we may say that they *must be*. That the three angles of any plane triangle must be equal to two right angles, or that the square described on the hypothenuse of any right-angled triangle must be equal to the sum of the squares on the other two sides, are inevitable sequiturs for all who accept the postulates, and understand the ideal scheme, of geometry. These statements not only are true, but they must be true *within that ideal scheme*. That an unsupported stone falls to the earth with a given acceleration, as a natural phenomenon is simply an observable fact; as a natural phenomenon there is (apart from metaphysics) no "must be" in the case. The idea of necessity only arises when we incorporate the facts in an ideal scheme of physics. Assuming the universality of the law of gravitation we may then say that, apart from disturbing influences, the stone must fall to the earth. But it is clear that the necessary and inevitable sequitur lies in the scheme of logical thought; and not in the observable sequences on which that scheme is founded. From the point of view we thus reach it may be said that any necessity we may ascribe to the observable sequences of natural phenomena is an importation from the products of our logical thought.

So far we have been endeavoring to make clear the nature of explanation and the relation which an ideal scheme with its logical sequiturs bears to natural phenomena with their observed sequences. We are now in a position to return to the third question we asked concerning Hume's doctrine of causation: Is his main contention accepted by modern science? That contention we summarised as follows: All that is disclosed in the objective treatment of experience may be expressed in terms of actually observed antecedence and sequence. If we ask what is the cause of the attraction, by the earth, of an unsupported stone, we shall perhaps be told "the force of gravity." And if we require more exact information, expressed in general terms, it will be said that every substance in the universe attracts every other substance with a force jointly proportional to the mass of the attracting and of the attracted body, and varying inversely as the square of the distance. How does

this force, as the cause of attraction, square with Hume's conclusion? Is there an observed antecedent "force" and then an observed sequent "attraction"? Surely not. From the physical point of view it is all one whether we say the force of gravitative attraction or the attraction of gravitative force. For physics the attraction and the force are identical. We may cut out all reference to force in the above statement of Newton's law without detracting from its scientific value, and say that every substance in the universe attracts every other substance *in a degree* jointly proportional to the masses and inversely as the square of their distance. That is a statement of observed and observable phenomena. And many physicists are content to restrict the term "force" to an expression, in mathematical formula, of the measure of intensity. For them physical causation may be expressed in terms which are essentially those of antecedence and sequence. Others, however, while they adopt this usage, give also another and distinct definition of force, as the cause of motion. It is not for an outsider to decide between contending giants. But to an outsider it seems perfectly clear that if force be regarded as the cause of motion, the word "cause" is used in a sense quite different from that which is founded on the conception of antecedence and sequence.

Let us frankly accept this conclusion. And let us speak of physical or scientific causation which refers events to their antecedents, generalising the results of observation in an ideal scheme of physical science; and let us speak of metaphysical causation which seeks to get behind or beneath phenomena and to give the *raison d'être* of their being, generalising its conclusions in an ideal scheme of metaphysical interpretation. And, with this distinction in view, let us proceed to consider physical causation a little more closely that we may see how far and with what amendments modern science accepts Hume's doctrine. Three points may be noticed.

1. Hobbes, in a passage which is quoted by Jevons, brought out an important feature when he said: "A cause is the sum or aggregate of all such accidents, both in the agents and the patients, as concur in the producing of the effect propounded; all which existing together, it cannot be understood but that the effect existed

with them; or that it can possibly exist if any one of them be absent." Mill accepted and endorsed this view. "The real cause," he said, "is the whole of the antecedents; and we have, philosophically speaking, no right to give the name of cause to any one of them exclusively of the others." True and important, "philosophically speaking," as is this identification of the cause with the totality of the antecedent conditions, it is none the less true that "scientifically speaking" it is the aim of physics to isolate the factors of phenomena and to disentangle the threads which are woven into the totality of antecedent conditions. It is this disentanglement which serves, in part at least, to distinguish the ideal scheme of physics from the complex web of natural phenomena which with ever-increasing success it enables us to interpret. At the same time it should be noted that this method of scientific procedure does not at all invalidate Hobbe's contention. For though physics adopts the method of analysis with a view to isolating the factors of causation, it still remains true that, when its results are applied to a complex phenomenon such as Hobbes had in view, no interpretation can be satisfactory unless all the co-operating antecedents are represented synthetically in due quantitative proportion. Accepting, therefore, the validity of Hobbes's contention that the cause is the totality of the conditions, we may add, as a rider, that science analyses this complex into its factors and utilises the results of its analysis in synthetic interpretation.

2. Hume's doctrine on the effects of custom and habit led him, no doubt, as Reid pointed out, to exaggerate the importance of the repetition of experience. When the conception of uniformity has been reached, a single accurate and precise determination of the essential antecedent conditions is sufficient. The value of repetition is, first, to eliminate errors of observation, and secondly (where others repeat the observations of the original investigator), to ensure the social validity of the conclusion, and to make allowance, if necessary, for the personal equation. Hume's error, if such it be regarded, arose from the fact that he had a double purpose in view; first, to show how the conception of uniformity arises, and secondly, to interpret causation in terms of observable sequence.

3. Much has been written concerning the time-element in causation; and it has been urged that, since the cause shades insensibly into the effect, so that it may even be said that the effect is already precontained in the conditions, the time-element must be excluded, and with it, therefore, must go the whole conception of antecedence and sequence. Not a little confusion has, however, arisen from a failure to distinguish physical from metaphysical causation. In the latter, as we shall see, the time-element is absent; but in physical causation it is essential. But though it is essential, it is, after the method of science, carried in thought to its ideal limit. For an adequate conception of physical causation, as interpreted synthetically by modern science, two essential ideas have to be borne in mind. First, the continuity of progress wherein there is a constant shading and passage from antecedent into sequent; and secondly, the ideal nature of the boundary between the one and the other. For the purposes of our thought we draw this ideal plane, at any moment we wish to select, through the onward-flowing stream of events. The totality of conditions on the one side of this dividing plane we term the cause, the totality on the other side of the plane we call the effect. But the dividing plane has no existence save for our thought; and its time-breadth, reduced to its ideal limit, is for that thought infinitesimal. It is like the philosophical concept of the present,—the mere dividing line between the past and future. When we narrow down our consideration of physical causation to its ideal limits, we place ourselves on this dividing line and see cause pass into effect as the stream of phenomena crosses the boundary.

Such, I take it, is the conception of physical causation we reach when we reduce the notion of sequence to its ideal limits. It is the doctrine of Hume translated from the region of practical observation into the region of conceptual thought founded thereon. And in this sense we may say that modern science accepts the doctrine in its essential features. Why the sequence is of that nature which we find it to be in the data of sensory experience, physical science as such, does not, I conceive, attempt to explain. Here

are the facts as practically given; that is an end of the matter so far as physical science is concerned.

Some physicists are, however, as we have already noticed, unable to accept this limitation. They define force as a cause in a sense wholly different from that in which this term is used as the equivalent of antecedent. But they do so as metaphysicians not as physicists. They supplement that kind of explanation which we term physical by the totally different kind of explanation which should in strictness be regarded as metaphysical. Force as a cause of motion is not its antecedent but its *raison d'être*.

The origin and justification of such procedure would seem to be somewhat as follows: First as to origin. Certain objective sequences are given, as matter of fact, in sensory experience. The terms of any sequence, so given, are, as Hume contends, conjoined but not connected. By analysis, generalisation, and synthesis we frame an ideal scheme of physical science, founded on the data of experience. Within this scheme the terms are not merely conjoined, but are logically connected for rational thought. We then project into the mere sequences, given in sensory experience, connexions analogous to those which obtain within the ideal scheme of physical science. We make the connexions part of our completed construct. So much for origin; now for justification. The ideal scheme of physical science is admittedly rational and connected. But when this scheme (which is the product of rational thought) is applied to the data of sensory experience (which are independent of our rational thought and over which reason has no control) it is found to fit the given sequences. Hence, just in so far as the connexions of the ideal scheme coincide with the sequences of sensory experience, may we assume that these sequences have an underlying connexion which metaphysics endeavors to formulate. In brief therefore the justification runs thus. The constructs of physical science supply us with an ideal scheme which is connected, rational, and explicable. But this scheme seems to fit the constructs of sensory experience. Hence they too are assumed to be connected, rational, and explicable.

It may be said that, since the ideal scheme of physical science

is founded on the data of sensory experience, its connexions are derived from, and not imported into, the sequences of natural phenomena. But it is clear that, unless we are to deny in our conclusion what is granted in our premises, this is no argument against some metaphysical connexion. It merely asserts that the connexion is already there awaiting our discovery. A more plausible criticism is that since the sensory data form part of the experience of a rational being they must, as such, be logically connected. But the sensory data are not the product of our rational thought. And if they were, what ground would there be for the contention that they are merely observable sequences without underlying connexion? It is this contention which the metaphysician deems inadequate and desires to supplement by his doctrine of causation.

Here it will be necessary to make a fresh start and approach the problem by a somewhat different path. It will be remembered that, in my former essay, the question: How is it that we have sensory experience? was passed by as one involving a metaphysical answer. Speaking of the milestones on the Dover road I said: "And if it be contended that something, at any rate, does exist, independently, which generates, or is the occasion of, the several experiences of those who journey along the Dover road, I am certainly not prepared to deny the statement; but it belongs to the domain of metaphysics, not to that of practical knowledge." The real question here is: What causes experience? And this question cannot be answered in terms of physical antecedence but only in terms of metaphysical causation. The practical man in the street, who does not realise that he is a metaphysician *malgré lui*, may be inclined to doubt this. But it cannot be seriously questioned by any one who considers the nature of the inquiry. Physical causation deals with antecedence and sequence as given in experience. But that which we now wish to ascertain is what calls experience into being. The separation of a stone from the earth is the antecedent condition of its fall; but if we ask, what makes it fall, we are constrained to have recourse to the metaphysical conception of gravitative force. Even if we could say with any certainty that the physical antecedent is some kind of ethereal stress, we should still

have to ask, what makes the ether "stressy." Push any physical or scientific inquiry deep enough, and you get the general reply, "That's the way things are constituted." And man the metaphysician will still want to know what is the cause of this constitution.

Of course I am fully aware that many philosophical agnostics contend that the modest and honest attitude in face of such inquiries is a confession of ignorance. "We don't know and there's an end on't." But it is, rightly or wrongly, characteristic of the metaphysician that he cannot rest content with this reply at this stage of the inquiry. He must endeavor to get a little deeper down and frame a wider construct, even if he then, in his turn, must make confession of ignorance of its nature independently of our rational thought.

Let us see then how metaphysics sets to work and what kind of suggestion it has to offer. It proceeds on the method of science and frames an ideal scheme. And it tests the validity of the scheme by applying it to the phenomenal universe, as interpreted by physical science, to see how it fits. If the ideal scheme, fashioned by human reason, when superimposed upon the sensory data, over which reason has no control, is found to coincide, metaphysics regards this as the only possible, but at the same time the rationally sufficient, guarantee of its validity. Sensory experience discloses a sequence of phenomena. If we ask why this sequent follows that antecedent, experience and physical science can give no answer. They can only say: Such are the facts as given. Metaphysical assumptions give an ideal scheme as a framework, supplying the threads on which the passing beads are strung.

A fundamental assumption of metaphysics is the continuity of that existence which is capable of acting as cause. Of this existence the data of sense-impressions are regarded as the effects. The effects may come and go, with the opportunities of experience; but the existence by which they are caused persists. As people pass to and fro along the Dover road, the mile-stones pop in and out of experience; but the existence which causes these fleeting effects remains and abides. The discontinuity of sensory experience is supplemented by the continuity of metaphysical existence. John

Stuart Mill, who is not generally regarded as a champion of metaphysics, would describe the mile-stones as "permanent possibilities of sensations." But whence did he derive the permanence? Not from experience: for experience, which relies solely on its own data, has no right to go beyond them, or to make any assertion, positive or negative, as to what exists in the absence of experience, when no one is travelling along the Dover road. There seems to be little difference between a permanent possibility of sensation and a continuous existence capable of acting as cause. But the former is pseudo-experiential and the latter is frankly metaphysical. The ideal scheme of metaphysical existence is however to be regarded, like the ideal scheme of physical science, as a construct of the human mind, valid just in so far as it fits the facts. Though here again the accord of a rational scheme with the observable data of experience may be regarded as presumptive evidence of the rational character of these data.

It may be said that the continuity and rationality of causal existence are after all nothing more nor less than our old friends the uniformity of nature and the universality of physical causation masquerading in metaphysical disguise. To which the metaphysician's reply is that, just in so far as the nature, of which uniformity is predicated, is a *connected* whole, and not merely a given series of observed, remembered, or anticipated experiences, are metaphysical assumptions inevitable, whether the man who makes or accepts them realizes their true character or not. Furthermore, for the thoroughgoing experientialist, the so-called uniformity of nature is nothing more nor less than the uniformity of experience. He who believes in a material universe which exists independently of our experience, and teaches that this material universe is the cause of our sensory impressions and the like, is committed to a metaphysical proposition which the experience on which he relies can never be in a position to demonstrate. And so we seem to be fully justified in asserting that just in so far as the uniformity of nature is held to be a cause of (and not merely a convenient expression for) the uniformity of experience it is a metaphysical and not a physical conception.

If we thus assume, as a fundamental postulate of metaphysics, an existence which is the cause of the sequences our sense-impressions present, we cannot regard it as, in its essential nature, like these impressions; for, to quote Glanvill once more, "the causality itself is insensible." It is unnecessary here to repeat the arguments of Berkeley and his modern disciples, by which it is, to my mind, conclusively shown that this existence, as cause, cannot be reasonably supposed to resemble the sense-products which are its effects in human experience. Those who understand the physiology of sensation and realise that what we call a visual impression is the concomitant of certain molecular vibrations in the grey matter of the brain, and that the brain particles are separated from the retinal image (to say nothing of all that lies beyond) by a tract of nerve-fibres conveying physiological impulses of whose nature we know little—those, I say, who realise all this, can hardly expect to convince us that the product in conscientiousness resembles in any conceivable way the cause which calls it into being. Philosophical materialism is, however, already so completely dead that it is superfluous to belabor its defunct corpse.

At the present stage of our inquiry it is, indeed, impossible to make any suggestion as to the metaphysical nature of that existence which we assume to play the rôle of cause. Carrying the conception to its ideal limits we may indeed predicate universality—on the lines of the scientific conception of universal gravitation. Thus regarded as universal, time-reference and space-reference would seem to become meaningless. The universalised present tense is alone admissible. When we speak of universal gravitation, we do not say that it was or will be; we use this comprehensive "is." We mean that substances always attract each other under the appropriate conditions. Time-reference is only applicable to the particular instances of such attraction as they fall under consideration. So is it with the existence which acts as cause: *It is.* The expression First Cause, if used with time-reference, is wholly misleading. It is probably a legacy of the confusion of thought between physical and metaphysical causation. The cause, as antecedent, is itself caused by a previous antecedent, this by an-

other, and so on in an indefinite retrogressive series, at the very beginning of which the First Cause was conceived as the very originating antecedent. On which follows the pertinent question, Why stop here? Presumably you do so simply because you do not know the antecedent of your First Cause. Why should I not stop just one stage short of your completed series and begin with what you term the second cause? The mistake, of course, is to confuse the conception of antecedent (which belongs to physical causation) with the metaphysical *raison d'être* implied on conception of a so-called First Cause. For metaphysics cause and effect are the two aspects, experiential and existential, of the same reality. They are simultaneous not successive; one on the hither side, the other on the further side, of the phenomenal veil. And the question—what is the cause of the cause?—is sheer nonsense, since it implies a misconception of the meaning of the term as used in a metaphysical as contrasted with a scientific scheme.

The absence of all space-reference, as applicable to metaphysical existence, involves further the exclusion of any conception of the cause as external. Externality, like time-sequence, is an idea based on sensible experience and has no place in the metaphysical construct. The existence as cause is conceived not as external to the phenomena and producing them from without, but as co-extensive with the universe of experience and as everywhere immanent. Here again we are but carrying a cenception to its ideal limits. We have seen that physical causation, carried to *its* ideal limits, places the antecedent and sequent on either side of a boundary line which is conceived as in itself timeless and spaceless. Herein lies the metaphysical connexion between the conjoined phenomena. But such an ideal boundary may be drawn anywhere and at any time in the flow of natural events. Hence the conception may be universalised and conceived as everywhere and always within the connected phenomena, whenever and wherever they occur.

Thus we reach the metaphysical conception of a unifying existence, omnipresent in space and time, and immanent, founded on the conviction that experience is rational and explicable—a convic-

tion without which the search for knowledge is a vain and illusory dream-quest.

It only remains to point out, or to repeat, that the metaphysical scheme is a construct of the human mind. If it leads us to believe that behind the realities of experience there is a causal reality which makes that experience possible and explicable, we must remember that metaphysical existence is a reality *for rational thought*. And if, in Kantian phrase, we speak of this existence as *noumenal*, as contrasted with the phenomenal data of sensory experience, we must define "noumenal" as that which exists for thought but not for sense, and has for thought a reality analogous to that which is the indefeasible right of sensory experience. Science presents us with an ideal scheme formulated in terms of antecedence and sequence; metaphysics with an ideal scheme by which this antecedence and sequence may be rationally explained. If we admit, with Hume, that natural phenomena are merely conjoined, we may none the less claim that a causal nexus is a fundamental postulate of rational thought.

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ON THE PHILOSOPHY OF LAUGHING.

LAUGHING is the privilege of man, and we should expect that it has a profound and philosophical background. Not only that we laugh at all, but as a rule also what we laugh about is a matter of great significance. But although laughing is one of the peculiar characteristics of man, we cannot say that the more a man laughs the more human he is. It is a prerogative, yet its use is limited, and it serves man as a relaxation only in the gravity of life; it is a kind of compensation for the seriousness of his duties.

Laughter is like the rainbow which originates through a sort of contrast of sunshine with rain. The dark background is needed, otherwise laughter would lack color. Take away the merry form in which fun is dressed, and you will find a very serious idea at the bottom of the object of all mirth. The higher the waves of humor rise, the deeper usually and the profounder is the earnestness of their hidden meaning. *Don Quixote* is exceedingly enjoyable, but it is also a satire and a very drastic one. Its melancholy moral is the condemnation of a misguided idealist; its inmost truth is a sad lesson. The comedies of Aristophanes, such as *The Birds* and *The Clouds*, are droll and frolicsome, but how terrible is the subject of every one of them! *The Clouds* depict the philosopher Socrates, whose eventual martyrdom is known; and *The Birds* are a humerous criticism of the Sicilian expedition undertaken with confidence and extravagant hopes but ending in the wreck of the whole Athenian navy and army, so that literally not one man escaped to tell the tale.

Comedy and Tragedy are akin. Both combat the insufficiency of the world and show us the way to conquer it. Tragedy exhibits

the struggle for ideals, to be fought with the bad, the unmoral, and the dark principles of the world, which by comedy are humorously castigated in their more trivial manifestations.

The world in its fundamental constitution is a unity which finds expression in the harmony of the laws of nature. The eternal divinity of the world is one with itself. But the actual details of reality present a constant restlessness. Life is a struggle in which the equilibrium of absolute satisfaction is necessarily unattainable. The unison of organised life is constantly jeopardised by all sorts of evil, which apparently justify both a dualistic philosophy and its correlate, a pessimistic view of existence. Yet through danger and death the unity of the whole can be restored; the problems of our doubt find eventually their solution, and the idea of monism will prove victorious in the end. In spite of all wickedness and mischief we cling to the standard of ideal aspirations, and our misfortune serves but to give our will a deeper root in the eternal order of things by transfiguring our being with the divine purpose of the whole. Thus pessimism will naturally lead to meliorism.

Life is serious, and if we could see all the misery of life at once it would so oppress us that we would long to die. But because life is serious, and because we need a buoyant spirit to fight the struggle of life bravely, we need as a temporary relief from time to time a hearty laugh. The man who always laughs lacks seriousness, he is silly. Constant laughing betrays a fool. But a man who cannot laugh had better consult his physician. He is sick. He is devoid of that elasticity of spirit which is so necessary for carrying the burden of life with ease and in good grace. He will not live long and had better attend to his last will. Laughter is a medicine that will heal sour dispositions and a bad temper or alleviate the loss of fortune and the buffets of ill luck.

It is a royal gift to be able to tell the truth with jokes and teach a lesson under laughter, as Horace says, "*ridentem dicere verum.*" Wilhelm Busch, the famous author of *Max und Moritz* has succeeded is giving to the world an exposition[1] of his philoso-

[1] *Eduards Traum.* By Wilhelm Busch. 1891. München: F. Bassermann.

phy in the report of a dream which is partly satirical, partly humorous, and full of the most ridiculous incidents.

The import of laughing as a wholesome factor in life can scarcely be underrated and has been freely recognised by some of the most serious thinkers of mankind. But the question rises, Why does man laugh? What is the comical, the ridiculous, i. e., the laughter-eliciting object, that something at which we laugh? Is it a fact that exists in reality, or is man's laugh purely a product of his subjective conception? What, in fine, is the nature of the ridiculous in all its various forms? What is the physiology of laughter, what its *raison d'être?* What is the law through which it exists? What are the conditions of its origin? In brief, what is its significance in the economy of nature?

A thorough investigation of the philosophy of laughter would fill volumes, but we may be permitted to skim the subject and present to our readers a few thoughts touching on the salient points without promising an exhaustive treatment.

Laughter is an outburst of sentiment, which, however, is limited to the realm of rational mentality. By virtue of its spontaneous nature it has been classified among the reflex phenomena of the organism and so would possess a certain resemblance to sneezing and coughing. But granting that laughing is a reflex, we must bear in mind that it is a mental reflex; it is an immediate response to a stimulus. The comical does not tickle the diaphragm but the intellect. It is a physiological not a mental stimulus.

Aristotle, in speaking of comedy, explains the nature of the ridiculous (*τὸ γελοῖον*) in his *Ars poetica* as follows:

"The ridiculous is something that is faulty and ugly, if painless and not injurious.[1] Thus, for instance, a ridiculous farce is something deformed and distorted without pain."

Cicero, in his discourses on Oratory and Orators, is apparently under the influence of Aristotle. His terms "*turpitudo et deformitas*" are unquestionably a translation of *ἁμάρτημά τι καὶ αἶσχος*. Cicero introduces Cæsar's opinion on wit, which is said to be a gift of nature not subject to rules. Cæsar says:

[1] *ἁμάρτημά τι καὶ αἶσχρος ἀνώδυνον καὶ οὐ φθαρτικόν.*

"I think that a man who is not destitute of polite learning can discourse upon any subject more wittily than upon wit itself. Accordingly, when I met with some Greek books entitled *On Jests*, I conceived some hope that I might learn something from them. I found, it is true, many laughable and witty sayings of the Greeks; for those of Sicily excel in that way, as well as the Rhodians and Byzantines, but, above all, the people of Attica. But they who have attempted to deliver rules and principles on that subject, have shown themselves so extremely foolish that nothing else in them has excited laughter but their folly. This talent, therefore, appears to me incapable of being communicated by teaching. As there are two kinds of wit, one running regularly through a whole speech, the other pointed and concise; the ancients denominated the former humor (*Cavillatio*), the latter jesting (*Quippe*). Each sort has but a light name, and justly; for it is altogether but a light thing to raise a laugh."

Cicero's further exposition of the subject, the main passages of which are again accredited to Cæsar, is apparently a diligent digest of the opinions of classic antiquity. We may be pardoned for quoting large extracts from this chapter because the views presented in it have influenced almost all later authors who have written on the subject, and not everybody has his Cicero handy. Julius Cæsar in reply to some questions and objections of Sulpicius, Crassus, and Antonius, says:

"Concerning laughter, there are five things which are subjects of consideration: one, 'What it is;' another, 'Whence it originates;' a third, 'Whether it becomes the orator to wish to excite laughter;' a fourth, 'To what degree;' a fifth, 'What are the several kinds of the ridiculous? As to the first, 'What laughter itself is,' by what means it is excited, where it lies, how it arises, and bursts forth so suddenly that we are unable, though we desire, to restrain it, and how it affects at once the sides, the face, the veins, the countenance, the eyes, let Democritus consider; for all this has nothing to do with my remarks, and if it had to do with them, I should not be ashamed to say that I am ignorant of that which not even they understand who profess to explain it. But the seat and, as it were, province of what is laughed at (for that is the next point of inquiry), lies in a certain offensiveness and deformity; for those sayings are laughed at solely or chiefly which point out and designate something offensive in an inoffensive manner. But, to come to the third point, it certainly becomes the orator to excite laughter; either because mirth itself attracts favor to him by whom it is raised; or because all admire wit, which is often comprised in a single word, especially in him who replies and sometimes in him who attacks; or because it overthrows the adversary, or hampers him, or makes light of him, or discourages, or refutes him; or because it proves the orator himself to be a man of taste, or learning, or polish; but chiefly

because it mitigates and relaxes gravity and severity, and often, by a joke or a laugh, breaks the force of offensive remarks, which cannot easily be overthrown by arguments. But to what degree the laughable should be carried by the orator requires very diligent consideration."

"The first point to be observed is, that we should not fancy ourselves obliged to utter a jest whenever one may be uttered. A very little witness was produced. 'May I question him?' says Philippus. The judge who presided, being in a hurry, replied, 'Yes, if he is short.' 'You shall have no fault to find,' said Philippus, 'for I shall question him very short.' This was ridiculous enough; but Lucius Aurifex was sitting as judge in the case, who was shorter than the witness himself; so that all the laughter was turned upon the judge, and hence the joke appeared scurrilous. Those good things, therefore, which hit those whom you do not mean to hit, however witty they are, are yet in their nature scurrilous; as when Appius, who would be thought witty—and indeed is so, but sometimes slides into this fault of scurrility—said to Caius Sextius, an acquaintance of mine, who is blind of an eye, 'I will sup with you to-night, for I see that there is a vacancy for one.' This was a scurrilous joke, both because he attacked Sextius without provocation, and said what was equally applicable to all one-eyed persons. Such jokes, as they are thought premeditated, excite less laughter; but the reply of Sextius was excellent and extempore: 'Wash your hands,' said he, 'and come to supper.'"

"Nasica, having called at the house of the poet Ennius, and the maid-servant having told him, on his inquiring at the door, that Ennius was not at home, saw that she had said so by her master's order, and that he was really within; and when, a few days afterward, Ennius called at Nasica's house, and inquired for him at the gate, Nasica cried out that he was not at home. 'What,' says Ennius, 'do I not know your voice?' 'You are an impudent fellow,' rejoined Nasica; 'when I inquired for you, I believed your servant when she told me that you were not at home, and will not you believe *me* when I tell you that I am not at home?'"

Horace in his *Ars poetica* gives us a practical illustration of his theory of the ridiculous; he says:

> "Humano capiti cervicem pictor equinam
> Jungere si velit, et varias inducere plumas.
> Undique collatis membris, ut turpiter atrum
> Descinat in piscem mulier formosa supernè,
> Spectatum admissi risum teneatis, amici?

Which means: If a painter should place a human head on a horse's neck, adorn it with feathers and attach to it limbs of all kinds, making it above a beautiful woman and below a fish: would you not laugh if you saw it?

Doubtless we should laugh if we saw things joined together that did not agree; but we should probably not laugh so much at the picture as at the artist who had such odd ideas and painted them where they were out of place. No one laughs at a griffin on a coat of arms or at a sphinx in a masonic temple. At mermaids in fairy tales who are beautiful women above but have ugly fish-tails below, we do not laugh; for there we naturally expect to meet with grotesque forms. The first picture of Boecklin will strike us as extremely funny, but as soon as we know that such is the artist's style, that he paints nothing but Nereids, centaurs, and other fabulous creatures, his mannerism will no longer be regarded as comical.

Modern explanations of the nature of the ridiculous do not greatly depart from the Aristotelean idea. Kant's theory of the ridiculous is interesting but unsatisfactory. "The cause of laughter," he says, "is the sudden transformation of a tense expectation into nothing." Kant's best example is the story of a Hindu who, seated at the table of an English gentleman in Surat, saw a bottle of ale opened from which the froth came out profusely and violently; he expressed his surprise at the unwonted sight and said in explanation of his astonishment: "I do not wonder at its coming out, but how any one could have put so great a mass of foam into so small a bottle, I cannot understand." It is natural that we laugh at the Hindu, but we do not laugh, as Kant says, because our expectation which has been held in a state of tension, when relaxed, suddenly disappears into nothing;" we simply laugh at the ignorance of the man who seeks the difficulty in a wrong place.

Another of Kant's stories is this. A circle of his friends were displeased at some one who was boring them with a long and improbable tale, designed to prove that through grief the hair of a person could turn gray in a single night, when a waggish rogue began to set forth the details of the grief of a merchant who on his return home from India encountered a heavy storm and was obliged to throw all his possessions overboard, adding that he was so much grieved at his loss that in the same night his wig turned gray. We are sure that every one present laughed, but did they laugh because their expectation ended with a sudden disappoint-

ment, and the argument vanished into nothing? Not at all. They laughed at the disappointment of the first speaker who was convinced of meeting an ally when actually he was duped by an adversary in ambush.

Jean Paul Richter treats the ridiculous with much grace in his *Vorschule der Aesthetik*; he calls humor the inversion of the sublime and tries to explain the former from the latter. The sublime is a perfect teleological adaptation; the comical, however, is its contrary, it is *Zweckwidrigkeit*. His theory is scarcely tenable, and we enjoy more his examples than his argument. Solger, following Kant and Richter, contrasts the comical with the sublime, and Sulzer defines the ridiculous as an absurdity (*Ungereimtheit*) or a deformity (*Missverhältniss*), which appears to be a mere repetition of the Aristotelian theory.

Floegel has done much valuable work on the subject but has not advanced an original theory.

Vischer treats the comical in its connexion with the beautiful. He defines the beautiful as the sense-appearance of the idea, *das sinnliche Scheinen der Idee*. All pure types, as ideas realised in their perfection, are beautiful, but such types, as the monkey, representing transitions, or the porcupine, being an animal which reminds one of the thorns in the world of plants, are ugly; they are impure types; they are not realisations of a pure idea but contain contradictory elements. Thus the comical is, according to Vischer, not only lower than the sublime, but it is also (and here Vischer is mistaken) morally indifferent. He says:[1]

"Tragical irony differs specifically from the typically comical, and we can use the former as a transition to the latter. For out of the negation of the former proceeds a new affirmation; and above the downfall of human sublimity rises the higher sublimity of the cosmic soul,—the *Weltgeist*. The comical, however, in its disappearance into nothing does not propose to affirm some higher sublimity; for the comical has no intention whatever, because it does not lead to any positive result. Hence it is not possible that in a tragedy the comical characters can have anything to say at the conclusion of the drama."

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[1] *Ueber das Erhabene und Komische, ein Beitrag zur Philosophie des Schönen*, p. 156.

We need not refute Vischer's proposition, for it is obviously wrong. Vischer defines the comical as the sublime made plainly perceptible,—*ein deutlich gemachtes Erhabenes*,—for, he adds, the plain appearance of all sensual details annihilates the semblance of infinitude (*Schein des Unendlichen*).

Mr. St. Schütze of Weimar has devoted a book of 274 pages to an explanation of the comical. He insists on its reality in the world. The comical, he says, is not merely a subjective product of the comical poet. "Its existence is as actual as the existence of the tragical; and man cannot escape either." (Page 20.) Schütze regards the funny as a result of man's limitations. Man believes himself to be free but finds by experience that he is a plaything of nature. The comical reminds man of his dependence upon physical conditions and points out by a humorous derision his relation to a higher state of freedom. The materiality of the world is the objective cause of the ridiculous, for materiality and spirituality form a contrast which manifests itself as an incomplete realisation of the ideal. Wit discovers similarities and subsumes discrepant things under the same category. (Page 144.) Satirical is that which castigates vices. (Page 236.) A joke is different from witty remarks in so far as it rests upon a figment; it either distorts the truth or is a pure invention. (Page 150.) A jolly temper finds expression in general merriment which in humor rises to a moral and intellectual height, for humor indicates a self-possession and joyful independence which is difficult to attain. (Page 161.)

Almost all modern æstheticians agree that the ridiculous is something awry or out of place, an incongruity of some kind due to a comparison of heterogeneous things.

Schopenhauer does not consider it worth while to refute the theories of Jean Paul Richter and others, but, as I understand him, his own explanation is not essentially different. He asserts that "Laughing arises from a suddenly conceived incongruence between some real object and its idea, and that it is nothing but the expression of this incongruence." And in another place he states the same theory in other words: "The origin of the ridiculous is

the paradoxical and therefore unexpected subsumption of an object under an entirely heterogeneous idea."

An example of Schopenhauer's is as follows: "A king of France travelling through Gascony laughs at a man of that province who in severe winter was lightly dressed, and asking him if he did not feel chilly, the poor fellow answered: "If your Majesty were dressed like me, you would feel intolerably warm." "Well," the king asked, "and what are you dressed in?" "In my whole wardrobe," was the reply. We do not laugh, as Schopenhauer thinks, at the incongruity of a king's wardrobe and that of the poor wretch, but simply at the king's being rebuked, which is done in a harmless way, without hurting his feelings, so amiably and gracefully that even the king could not help laughing, and openly acknowledging the peasant's petty triumph.

Schopenhauer tells another anecdote to illustrate his theory: "Some one says he likes to take his walks alone. 'So do I,' another person answers, 'let us walk together.'" Schopenhauer's explanation about incongruity does not hit the point; we laugh simply at the undaunted impudence of the intruder and perhaps also of the chagrin of him who tries in vain to escape. Suppose the lonely walker is just bent on avoiding for some reason or another the man who confronts him, and the latter, glad to meet him, is bound to speak to him, willy-nilly. The former will probably not laugh, while our mirth solely depends upon our sympathies with either party! We will laugh if we wish the intruder success.

Here is another instance: Soldiers on duty in a guard house have some one arrested and allow him to join in their game of cards. However, as he cheats, they kick him out, entirely forgetting that he is a prisoner. Do we laugh at the incongruity of the treatment of arrested people and at the general doctrine that rapscallions must be kicked out? No, we simply laugh at the stupidity of the soldiers who, in their zeal to punish a rascal, allow their prisoner to escape.

Schopenhauer's position is in one respect peculiar. While other æstheticians declare that we laugh at the deformity, ugliness, or insufficiency of the reality as it is in comparison with what it

ought to be, he contends that we laugh because the idea does not cover reality. We enjoy, he says, the victory of intuitive cognition in worsting abstract thought, This is a remark not of Schopenhauer the idealist, but of Schopenhauer the pessimist. The idealist ought to hail the superiority of the idea ; but here Schopenhauer sneers at the imperfection of man's highest and best.

Schopenhauer's theory is highly improbable. Is there any one who laughs at the insufficiency of abstract thought? Abstract thought has in most cases nothing whatever to do with laughing. In fact, the baby that is incapable of abstract thinking, laughs as heartily as grown up people.

The best explanation of laughing appears to have been offered by Dr. Karl Gustav Carus of Dresden, who regards laughing as the expression of life intensified, and weeping with its groans and moans as a depression of the vitality of the organism. In his opinion the reiteration of the laugh is due to an increase of breathing, while the sighs of the afflicted indicate a retardation of the life-process.

Darwin in his very instructive essay on laughter[1] explains it to be "primarily the expression of mere joy or happiness," and expatiates on its physical mechanism, on the construction of the zygomatic and other muscles, etc. He anatomises the physiology of laughing, adding : "but why the sounds which man utters when he is pleased have the peculiar reiterated character of laughter we do not know."

On the subject of tickling and the physiology of laughing, Darwin ingeniously remarks, "The imagination is sometimes said to be tickled by a ludicrous idea ; and this so-called tickling of the mind is curiously analogous with that of the body [*loc. cit.*, page 201]. . . . It seems that the precise point [in tickling] to be touched must not be known. So with the mind, something unexpected—a novel or incongruous idea which breaks through an habitual train of thought—appears to be a strong element in the ludicrous." Yet in spite of this similarity of laughing to reflex motions, he maintains

[1] Chap. 8 in *The Expr. of the Emot.* etc.

that there are different causes which call forth the simple childish laughter and that of adult persons, and he adds, laughter from a ludicrous idea, though involuntary, cannot be called strictly a reflex action [page 201] in man and animals.

Also Mr. Herbert Spencer has ventured an explanation of laughing in his *Physiology of Laughter*,[1] where he remarks, "A large amount of nervous energy instead of being allowed to expend itself in producing an equivalent amount of the new thoughts and emotion which were nascent, is suddenly checked in its flow. . . . The excess must discharge itself in some other direction and there results an efflux through the motor nerves to various classes of the muscles producing the half-convulsive actions we term laughter."

Laughing is perhaps a simpler process than we think, and our philosophers in seeking an explanation go too far. Kant ought to have found it, when he discovered the key to the universe in the *a priori* which is rooted in our subjective disposition. Why did he not think of his idealism when inquiring into the nature of the ridiculous? All æstheticians from Aristotle down to the present time have attempted to explain the ridiculous from the object which elicits ridicule and excites merriment. It behooved a Kant to turn the tables, as he did in other respects and as it was the tendency of his philosophy. Since he himself forgot his own theory let us try to explain the ridiculous not objectively from the thing laughed at, but subjectively from our laughing. Let us, accordingly, not ask, what we laugh at, but why we laugh; and what we mean to express by our laughing.

Schopenhauer says that the mental instigation of laughter must be explained from a function of our brain, which when suddenly grasping the incongruence of an intuitively perceived object with an abstract idea, simultaneously affects the medulla oblongata or some other organ from which this queer reflex motion proceeds, shaking at the same time so many different parts of the body.

This is an explanation based on a vague hypothesis and attempts to prove what is not true, viz., that laughing starts from the

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[1] Essays, 2nd Series, 1863, p. 114.

seat of abstract thought, while actually it is the expression of a sentiment which like other sentiments affects the lungs and the heart. Laughter is the expression of an exhilaration and should be contrasted, not so much with weeping, as with moaning. Weeping is only one form of moaning. Both laughing and moaning are "affectives" that interfere with breathing. Laughing consists in quickly repeated ejaculations of a triumphal shouting, while moaning is a suppressed but continued sigh, the expression of pain. Moaning, as Karl Gustav Carus rightly remarks, affects the lungs by retarding our breathing while laughing accelerates breathing and thus preoccupies our lungs, not leaving them sufficient time to perform their function properly. It is indirectly through the disturbance of the function of the lungs that laughter shakes the diaphragm.

Laughing is not a matter of intellect but of character. It depends more on our disposition than our thoughts; and as we sometimes betray our feelings in spite of ourselves, so our laugh may frequently carry us away despite our trying to master and suppress it.

But what is the significance of the reiterated shouting which we experience in laughter? The answer seems simple enough. Can it be anything else than a shout of triumph, the loud announcement of a victory, and an expression of joy at a success of some kind?

Imagine we ejaculate a single laugh for some reason or other, say because we have succeeded in something by a sudden stroke, be it by words or by a deed outwitting an enemy of ours. "Ha!" we exclaim, raising our voice to an unusual pitch. The aspiration of our voice is so much stronger than in the common pronunciation of *H* as to set the full compass of our lungs in motion down to the diaphragm, which being connected with the lungs is thus mechanically raised. If this *Ha!* be repeated several times, it forms a volley of ejaculations by which the whole breast begins to shake; and such a phenomenon is a regular laughter, which is nothing but the abbreviation of a triumphal shout. Translated into common parlance it means: "Hurrah, I have got the best of you and you are worsted."

We laugh only at petty triumph. We never laugh when gain-

ing a great victory, as on a battle-field; in such a case we set up a regular shout of triumph. But suppose it be a trivial affair of common everyday life, it is but natural that the expression thereof should be diminished to a miniature shouting.

If the cause of laughter were, as our philosophers say, a painless faultiness or incongruity, why do we neglect to hail with laughter the innumerable harmless discrepancies in the world? If a transformation of intense expectation into nothing were in itself comical, why are not the losses of fortune, or if that be too painful, at least the losses in a game of cards, funny? If laughing were a discharge of checked energy in another direction, as Mr. Spencer has it, we ought to say that a boiler laughs when its steam is let off. We think it very improper to laugh at institutions or persons which we do not like to expose to a harmless defeat; but if the traditional explications were admissible, there would be no cause whatever for being offended at any laughter, nor could we explain its being prohibited in serious and sacred matters. The reason is that laughter expresses an exultation which must appear improper whenever we are in the presence of what is sublime and holy.

Our explanation of laughing, then, certainly agrees with the popular idea, according to which the word is used to express any kind of triumph. The proverb says: "He who laughs last laughs best;" which does not mean, he laughs best who gives vent in reflex motions to the last impression of an incongruity between reality and an idea, or experiences a contrast, or detects some painless deformity; but it states simply the fact, that he enjoys the best triumph who is victorious in the end. To laugh means to triumph.

We may distinguish different kinds of laughter according to the sound. The laughter in *e*, "Hee-hee!", is the hiss and sneer of a trickishly gained victory; the laughter in *ey*, "Hey-hey!", expresses contempt at a worsted wretch who is now at our mercy; the laugh in *oh*, "Hohoh!" is a scoff of self-exaltation, as if to say, Is it possible that you could be so stupid; in *oo* it marks disgust. The object of our laughter is pooh-poohed by a "Hoo, hoo, hoo!" which sounds like a protest that we won't have anything to do with the matter in question. The clearest and purest vowel, which is *ah*,

is characteristic of the gallant victor, who does not intend to sneer or to scoff at his adversary, but simply enjoys a pure-hearted triumph. All kinds of laughter, however, equally participate in the initial consonant *h;* which denotes spirited pride and mirth, symbolising the exulting breath of a swelling bosom and being in reality the attestation of a self-possessed mind, a victor and conqueror.

Let us now see whether this explanation of laughing can serve as a theory that will account for the ridiculous in its various forms. We trust it will. We do not laugh merely at witticisms, puns, and jokes. If two persons are running a race, he who outruns the other will laugh at his defeated rival. Why? Because a laugh is the expression of a trivial triumph. When a child plays hide and seek with its nurse, the child laughs as soon as it finds her; and who would in that case think that the child laughs because he sees anything incongruent, or hears any witty remarks that express a contrast, or because he discovers the combination of heterogeneous objects, or meets with a faulty and ugly thing. The child simply laughs to express his feeling of triumph. A child will laugh at anything, if he is in good spirits, just as a dog will bark and a horse neigh when in good health on their start for an outing. It is an expression of the joy of life and a consciousness of vigor which is capable of coping with any anticipated difficulty. A placard in a show contained the announcement that a rose-colored horse was to be seen within. People entered at the front and were dismissed through a rear door. The man who showed this wonder of nature led the public to a white horse garlanded with wreaths of white roses. He outwitted the public who forgot that there were roses of different colors. When we laugh at the fraud, we applaud the success of the trickster.

Yet we must bear in mind that a petty victory which we hail with shouting is always sudden. There must be one moment in which all our exultant joy appears concentrated. Victorious soldiers will shout the louder, the more significant the moment is, and they are the more clamorous in the announcement of their victory, the more unexpected it is. It is exactly the same with laughter. Shakespeare rightly remarks, "Brevity is the soul of wit,"

for indeed, the finale of a joke especially, its aim, must as much as possible be concealed; it must come as a surprise, as a sort of ambush, the appearance of which is at once recognised as decisive. If the enemy is eventually surrounded and gradually cut off from all hope, as was Napoleon III. at Sedan, wherever there is not one decisive blow, but a piecemeal victory, there is as little occasion for a triumphal shout as there is in an analogous case of word-battles for laughter. If in a taunt or in any witticism the point has been betrayed too soon, or if it be philosophically explained and analysed before it is fully told, there will be no response to the best joke.

Laughter is the expression of a sentiment, and in this sense its origin is of a purely subjective nature; but for that reason it is not void of objective significance. The objective conditions that elicit a laugh are any such situation which bodes either the victory or defeat of some one—perhaps of ourselves. An absurdity, or an incongruity, or the contrast of the real and ideal are never in themselves ridiculous; they become ridiculous only if they are somehow instrumental in defeating somebody, in worsting an adversary, or in conquering his cause. Nothing is in itself ridiculous, but anything will become so as soon as it serves to secure a harmless triumph.

Jonathan Swift is perhaps the most witty author in English literature. But the humor of his satires could not always be explained on the current theories. There lived in Swift's time an erratic man whose name was John Partridge, an astrologer, who in his annual almanacs never failed to make all kinds of bold predic tions. Swift proposed to trip him and began in his turn also to publish prophecies in which he boldly declared that Mr. Partridge would die on a certain day in the next following March. When the appointed day came, Mr. Swift solemnly announced the death of Mr. Partridge and asserted that it had taken place in accordance with the prophecy. The poor almanac-maker protested that he was still alive; but his assertion was met by his witty adversary with a solemn assurance that Mr. Partridge was mistaken, that he was actually dead, or at least ought to be dead. There is no incongruity in the joke. It is merely an act of pillorying a hopeless

ignoramus. Is it possible that we laugh at the incongruity of the dead and yet living astrologer? Or is there any conflict between the ideal and the real? Kant's explanation of a tense expectation which is resolved into nothing will scarcely suffice. Neither is there any amount of energy checked and suddenly discharged in our laughter, as Mr. Spencer would make us believe. There is simply a man over-trumped, not by subtle argument, but by blunt mockery. The more serious Mr. Partridge was in his replies, the more humorous the situation grew.

A dilemma is in itself by no means ridiculous, but if used for worsting an adversary it may become funny according to conditions. We may mention, e. g., that famous juridical instance in which a law student at Athens promised to pay his teacher when he would win his first lawsuit. However, having finished his course, he did not accept a case until his professor sued him. The professor now felt sure of obtaining his fee, for his pupil would have to pay in either case: if he lost his suit, the court would sentence him to pay, and if he won it, the student had won his first law suit. But the young man declared that, on the contrary, he need not pay at all; for either he won the case, in which event the court had decided in his favor; or he lost the case, and in that event he was under no obligation to pay on account of not having won his first law suit. This dilemma and counter-dilemma is not in itself laughable, but it contains conditions which may be utilised for a joke. Every joke must have a point; it must be directed against some-one or something; otherwise there is nothing at which we may laugh. Thus the dilemma becomes comical in discussions where it is a good and effective weapon.

Christ made frequent use of dilemmas in his controversies with the Scribes and the Pharisees. However, most people read the Bible too prayerfully to comprehend it, and fail to see the humor of Jesus when he defeats the learned dignitaries of the synagogue.

St. Luke says: "And it came to pass on one of the days as he was teaching the people in the temple, and preaching the Gospel, there came upon him the chief priests and the scribes with the elders; and they spoke saying unto him: 'By what authority doest

thou these things?'" No doubt the priests intended to stop his preaching on the plea that he had no authority, and if Jesus had claimed to have authority from God, they would simply have said: "We do not believe it, and as long as you cannot convince us, you cannot be allowed to teach in the temple." But Christ saw the snare and turned the two horns of a dilemma against them. He said: "I also will ask you a question, tell me: The baptism of John, was it from heaven or from men?" And they reasoned with themselves, saying: If we shall say from heaven, he will say why did ye not believe him? But if we say from men, all the people will stone us, for they were persuaded that John was a prophet. And they answered that they did not know, whence it was. And Jesus said unto them: "Neither tell I you by what authority I do these things." When the Pharisees, unable to answer, confess that they do not know, they could no doubt see smiles on the faces of the disciples and Jesus, and perhaps they met with sneers from the multitude.

Socrates used to defeat his enemies by following them on their own ground and leading them astray, carefully hiding the ambush which he prepared for them. At last they see themselves ousted from their position and entangled in their own inconsistency. This is called irony or simulation.

Another kind of *reductio ad absurdum*, not so refined, to be sure, but more drastic, is the method of exaggeration. For instance, some one boasts, in company, of his feats in swimming. He says, "I swam once across the Bosporus." His neighbor wants to show his incredulity and tries to outdo him. So he says: "That is nothing! I heard of some one who swam across the Channel." He might have triumphed had not the bold swimmer been ready to anticipate the blow by accepting the statement and adding pathetically: "Shake hands, dear sir, it was I who performed that deed!" In the domain of fun truth does not decide, and if the wit is applauded it is not because we believe his words but because we admire the quickness of his repartee.

Lies invented as a persiflage of the braggart, form quite a class of comical literature of their own. Such are the stories of Münchhausen, who saves his life when almost drowning in a marsh, by

pulling himself out by his own queue. Lies must be very good in order to be enjoyable. If there is no method in the madness of the story which would render it at least verbally possible, it will fall flat, and the imitator of Münchhausen will be hooted at. To castigate one who with poorly-invented stories had bored a circle of friends, some one began a tale of the Wild West. Having reported the exciting details of a fight with Indians, he describes how at last three men pursued him, but they were separated by considerable distances, which gave him a chance for escape. The first Indian overtook him, but he slew him; then came the second Indian, and he slew him also. And now the third one approached. Here the story-teller goes into details making his hearer impatient for the final outcome until he is interrupted with the question: "And you slew him too?" Then he replies gravely: "No, he slew me."

There is a way to catch unwary listeners by telling them long tales and at the height of their suspense reporting some impossibility, when he who believes becomes the general laughing stock. For instance a gentleman tells of some friend of his, an officer in the last war, who received a pension for the loss of one arm. When the pensioner learned that his pension would be doubled if he had lost both arms, he drew his sword and cut off his other arm. If a joke of this kind is involuntary it is called an Irish bull.

It is not necessary that the worsted party should be the dupe of somebody else; he may be entrapped in his own snares or by awkward circumstances. This is called a comical situation. Examples are plenty, and any good comedy will afford instances of it. There are all kinds of awkward positions into which persons are pushed either by their own folly and vice or by the malignity of others. Such is the case of Malvolio when falling in love with his mistress Olivia through the intrigues of her maid; and such, in the animal fable, are the misfortunes of the bear, the cat, and the wolf, who become the dupes of "Reynard the Fox." In Goldsmith's comedy *She Stoops to Conquer* Mrs. Hardcastle is by the tricks of her spoiled son Tony almost frightened to death in her own garden while she believes herself to be in Crack-skull Common, the most notorious spot in all the country. Sometimes people come

into a comical situation by ill-luck, and we laugh at their predicament; but, of course, we must always feel sure of a happy exit; the conflict must never grow tragical.

An inexhaustible source of hilarity is naïveté. There are daily new adventures that happen to both small and adult children. Such innocence at home and abroad may be found everywhere. Mark Twain is the classical author in this line of fun. Other remarkable productions of this type are in French *Tartarin* and in German *Die Familie Buchholz*.

There are persons who assume the mask of naïveté in order to make others laugh. If they wish to be sure of success, they must never laugh themselves but must play their part as long as they intend to keep their hearers in good humor. As soon as they laugh themselves, the spell is broken. The following story may serve as an instance of this kind of fun in which naïveté is assumed, but not genuine. Around large cities in Europe the hunting is annually leased by auction to the highest bidder. Thus it is usually in the hands of rich philistines, people who are sometimes very bad hunters. One of them once said to his fellow-hunter: "We pay for hunting one thousand dollars and shoot scarcely fifty hares. So every hare which we shoot costs at least fifty dollars." "So much?" said his friend. "Then I am glad we don't shoot more."

Men like to be merry, and so they laugh and find ridiculous subjects everywhere. Sometimes the worse their own situation is, the more they enjoy a laugh to balance their sorrows. If they are knocked down in life by the buffets of fate or by some enemy, they may, if they have but the humor to do so, fancy their victor to be in some ridiculous position, and at the mere play of imagination they will momentarily cure their ailments as if they were in no trouble whatever. It is a matter of fact that during the first French Revolution people in the face of the Guillotine jested at their keepers, tyrants, and judges. And the great Cervantes wrote his Don Quixote when imprisoned in a sponging-house. We might almost think the greater the danger, the better the fun. Soldiers in war are usually full of jokes, and even the conquered party indulge in witticisms, thus enjoying the harmless laugh of at least an imaginary

triumph. The world affords enough material for ridicule, if we but detect it; and where there is none, we are able to create it from a mere nothing. The mere idea of a reversed world suffices to excite merry laughter.

As beauty draws more than oxen, so wit is a more effective weapon than the sword. When in 1794 the question of the emblems and devices of national coins was before the House of Representatives, Matthew Lyon, a congressman from the South, stoutly opposed the eagle as being a monarchical bird. The king of birds, he thought, being an emblem of royalty, could not be a suitable representation of a country whose institutions were founded in opposition to kings. In reply Judge Thatcher proposed to have a goose as coat of arms for the United States, for the goose, he said, is a most humble and republican bird, not a beast of prey but a useful creature and would in other respects also prove advantageous, in as much as the goslings would be convenient emblems for the dimes. The laughter which followed at Mr. Lyon's expense was more than he could bear. He construed this good-humored irony into an insult, and sent Judge Thatcher a written challenge. The bearer delivered it to Mr. Thatcher, who read it and, handing it back, observed that he would not accept it. "What?" said the visitor, "will you be branded as a coward?" "Yes, sir, if you please. I always was a coward, and Mr. Lyon knew it, or he never would have challenged me." The new joke could not be resisted even by the angry party, and occasioned much mirth in congressional circles. The former cordial intercourse between both gentlemen was soon restored, for Mr. Lyon wisely concluded there was no use trying to fight an adversary who fired nothing but jokes.[1]

A witty remark once saved the life of a clergyman in the French Revolution. When surrounded by a mob shouting "*à la lanterne!*" he calmly asked: "Do you think it will give you more light if you hang me to the lantern-post?" The mob laughed and let him go.

Witticisms need not necessarily hit a certain person; they may

[1] *Illustrated History of the U. S. Mint.* Philadelphia.

be aimed at a class of people or even quite abstractly denounce folly in general. Ancient historians inform us that Pythagoras, when he had discovered the theorem which up to this day bears his name, offered the sacrifice of a hecatomb to the gods. Archæologists, to be sure, doubt whether hecatomb means every hundredth ox or literally a hundred oxen. The latter, certainly, would have meant a great slaughter among the cattle. "Since that day," Heine says, "all oxen are afraid lest a genius discover a new theory; and hence we may well understand their interest in thwarting all such attempts. Therefore, when you have new ideas, beware of oxen!" The joke on the hecatomb of Pythagoras is not original with Heine; for we find a similar remark in the lectures of Hegel who expresses the same idea more concisely about as follows (I quote from memory): "The days of Pythagoras were a great time, when the new ideas of a genius were celebrated with hecatombs for the best of mankind—at the cost of the oxen."[1] Since Heine attended Hegel's lectures, it is very probable that he is indebted for the idea to the philosopher of the Absolute.

Having characterised in outline the origin and meaning of the human laugh and having found that the explanations, current among our leading philosophers from Aristotle down to Mr. Spencer, have overshot the mark and sought the solution of the problem which lies quite near, at too great a distance, we find ourselves actually at the beginning only of our investigation. Having found that laughing is an abbreviated but reiterated shout of triumph, we may now go over the whole field and revise the various detail problems connected with our subject. We may, for instance, inquire what, if anything, corresponds in animal life to the human laugh. Although it is quite true that laughing is a human prerogative, we may find that there are some expressions of mirth noticeable in the life of some higher animals which can be interpreted as an incipient laugh.

There are many additional problems connected with our sub-

[1] "Es war eine grosse Zeit [die des Pythagoras], als die neuen Gedanken des Genius mit Hekatomben gefeiert wurden zum Frommen der Menschheit,—auf Kosten der Menschheit."

ject. We may ask, Is it possible to introduce the ridiculous into the realm of music, that is to say: Could a composer make people laugh with purely musical means? This would exclude comical songs as well as musical travesties; for the fun of the former consists in the words and is only heightened by an appropriate melody, while the latter are distortions of a melody which is associated with certain sentiments or ideas. The humor of a musical travesty is the product of its associations and does not lie in the music itself.

Further, the methods of attaining a triumph are different. We must therefore expect to have different conditions of that which will induce us to laugh. We should have to trace the differences between the ridiculous and the foolish, the comical and the funny, the satirical and the sarcastic, the ludicrous and the jocular, the odd and the grotesque, the droll and the baroque, the outlandish and the burlesque, mockery and scoff, irony and humor. We abstain from entering into these questions, because a discussion of them would take much space and time, and would, after all, throw very little light on the theory of laughing in general. We will, in fine, mention only one problem which has a certain moral significance: "Can any one laugh at himself?" Jean Paul Richter thinks not; at least not while we are in a ludicrous situation. He says: "No one can laugh at himself, unless it be an hour afterwards," viz., when we have to some degree become some one else. Richter's theory would imply that we can never take a higher view of our own self; it would in fact exclude the possibility of what is called self-criticism and even self-control. It is true that there are many people who are unable to practise self-control and self-criticism. They are naturally unable to laugh at themselves. The ability of seeing the ridiculous side of oneself is a moral quality, it is a great thing in life, for the acquisition of which it would be worth while to pray daily the words of Burns:

"O wad some power the giftie gie us
To see oursel's as ithers see us."

The people who are unable to laugh at themselves, can never stand being laughed at by others. And why? Because they cannot

rise above themselves; they cannot judge of themselves as they would judge of others, impartially and justly. A man who quietly suffers himself to be the butt of a harmless joke and even joins the laughing party not only proves that he is good-natured, but also that he is free from vanity. Vain persons and egotists will never learn to stand a joke; they are irritable because they are worshippers of self and will not allow their deity to be triumphed over. To them their own person with all its faults is as sacred as are matters of religion to a devotee. Goethe therefore regarded the ability of good-naturedly allowing oneself to be laughed at as a sign of belonging to the aristocracy of head and heart. He says:

"Wer sich nicht selbst zum Besten haben kann,
Gehört mir wahrlich niemals zu den Besten."[1]

EDITOR.

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[1] The play on the word *Besten* cannot be translated. *Jemanden zum Besten haben* means "to make a joke at the expense of some one." *Sich selbst zum Besten haben* means "to suffer oneself to be laughed at by others." The comparative and superlative of "good" is, in the Teutonic languages, derived from a root *Bat* or *Bad*, from which the English *bad* and the German *Busse* (penalty) are derived. He who is "held to the best" is made to pay.

ON THE PHILOSOPHICAL BASIS OF CHRISTIANITY IN ITS RELATION TO BUDDHISM.

A LETTER FROM PROF. RUDOLF EUCKEN OF JENA.

THE MOST IMPORTANT DIFFERENCE between Buddhism and Christianity lies in the conception of the soul. While the Buddhist philosophy denies the existence of a separate individual self (which, of course, must be understood as implying a denial, not of man's personality, but only of the Brahmanical theory of a separate self or ego-soul, called the âtman), Christian philosophers have mostly insisted on the doctrine of a self-soul. Nevertheless, there may be, not only in ethics but also in their psychological theories, more agreement between Buddhism and Christianity than appears at first sight, for it is difficult to say what we must understand by self. Apparently the word personality is used by Christian thinkers in a very loose sense, for according to the doctrine of the trinity it is not incompatible to speak of three personalities in one. This implies that the fathers of the Christian Church did not think of a person as denoting an organised being of an individual type with a separate ego-consciousness. On the other hand, there are scattered in Christian literature a great number of passages showing that the Buddhist soul-conception is by nò means foreign to the leaders of Christian thought. Above all, the Apostle Paul emphasises very strongly the idea that his ego has disappeared. He says: "I am crucified with Christ, yet not I but Christ liveth in me." In the same sense St. Paul speaks of single individuals, in contrast to the evolution of the whole according to God's dis-

pensation, as being in themselves "not anything." He says (1 Cor. 3, 5):

"Who, then, is Paul and who is Apollos? . . . I have planted, Apollos watered; but God gave the increase. So, then, *neither is he that planteth any thing, neither he that watereth;* but God that giveth the increase. Now, he that planteth and he that watereth are one: and every man shall receive his own reward according to his own labour. For we are labourers together with God: ye are God's husbandry, ye are God's building."

Here apparently every one is supposed to have no separate existence whatever, except in and through God. It is God who planteth and God who watereth. But every one is nonetheless quite distinct and definite, for "every man shall receive his own reward according to his own labor."

The coincidence of Buddhism with Christianity is remarkable in this passage; for, as the Buddhist scriptures speak of the fruits of the karma, so Paul speaks of the reward of one's labors.

The Buddhist idea that salvation consists mainly in dropping our own self, in becoming nothing, in self-annihilation for the sake of becoming Buddha, viz., divinity incarnate, can be found in many Christian writings. The highest religious aspirations are not the result of an anxiety for the salvation of one's soul but a yearning for a union with God. Thus, Ignatius Loyola says in one of his hymns:

"Non ut salvas me
Sed quia amo Te."
[Not that thou shouldst save me,
But because I love thee.]

Master Tauler of Strassburg uses the words *entwerden*, which means to become nothing, and *vergottung*, i. e., becoming one with God. Among the theologians of the present century passages that breathe the same spirit can be found in Tholuck; otherwise modern theology is beginning to move more and more in the ruts of stereotyped pious phrases, and fights shy of anything that seems to indicate a philosophical conception of the soul-problem.

In consideration of the deep interest attaching to the problem of the soul, the editor of *The Monist* wrote to Prof. Rudolf Eucken

of Jena, who is perhaps the highest living authority on religious philosophy and philosophical terminology, requesting him to write an article on the subject. Professor Eucken replied as follows:

"The problem with which you are engaged is vividly echoed "by me, and I shall take special pleasure in serving you according "to the best of my ability by quotations from old Christian and "mediæval literature. To-day I send you at once a few extracts "from my own collections. Later on I shall supplement them with "passages of the same tendency, but I fear I shall not be able to "write an article on the subject as you suggest. The more shall I "be glad if you can make use of the quotations which I herewith "furnish.

"It seems to me that we must omit on this occasion the in- "numerable sentences which are pronounced against the punyness "of the ego and selfish pleasures. We must distinguish between "the religious sentiment concerning the insignificance of the in- "dividual as confronted with the highest power and such passages "as express the conviction of a deeper speculation. The latter idea "is found among Christian authors first in the writings of the "Alexandrians Clemence and Origen. Accepting Plato's view that "God is the highest good, these writers require the true Christian "to give "himself up entirely as a γνωστικός, a gnostic, to this "conception, "and thus he is deified (θεούμενος, *vergottet*).

"A deeper foundation is given to this view in the Neo-Platonic "doctrine that all reality is an emanation of God, and that all gen- "uine aspiration consists in a return to God, who is the essence of "the world. This conception was received by Gregory of Nyssa "and even in a higher degree by Dionysius, the pseudo-Areo- "pagite.

"In the Western Church, St. Augustine was first touched by "this idea, but through emphasising the idea of love and also "through his mysticism he gave a strong impetus toward the emo- "tional, wherein the Occidental Church followed him.

"The mystical tendency is most strongly developed in Scotus "Erigena, in which form, however, it was rejected by the Church. "From the twelfth century on a new ecclesiastical mysticism de-

"veloped, whose climax unquestionably was reached in Master "Eckhart. But he, too, at last came in conflict with the Church. "It is probable that in his writings will be found most to suit the "present purpose. Tauler and his followers are not quite so bold "and not quite so speculative as Eckhart. Nevertheless, there are "quite a number of interesting sayings in their writings. Luther, "however, was strongly attracted by that tendency only during the "years of his growth. In later years he was frightened away from "it by its pantheistic implications. Upon the whole, the Catholic "Church has less prejudice against these views than orthodox Prot- "estantism. Wherever there was found among the Protestants a "person inclined toward mysticism, as for instance Jacob Böhme, "he was always branded as a heretic and persecuted.

"The passages which I send you are not quite limited to the "problem of the ego. They go beyond it, but they contain much "that will be of interest and they certainly are symptoms of an as- "piration from a particularistic conception of Christianity toward a "general human view. I also add several passages which may "serve as instances that the old Christian ethics did not so lightly "dispose of the misery of the world as our modern Christian theo- "logians do. I quote the passages simply according to their au- "thors, and am convinced that a systematic search in this direction "will result in producing passages still more pregnant than I, at a "moment's notice, am able to adduce. But I shall keep my eye "on this question, and may be able later on to send you a further "communication.

"As to the word *entwerden*, I have to add that you are decid- "edly right. I have a passage of Eckhart in mind, which runs as "follows: *alles werden endet in ein entwerden*; and my Middle-High- "German dictionary defines *entwerden* as: (1) with a dative, 'to "escape'; (2) with a genitive, 'to be delivered from.' Also in this "direction I hope to find definite passages, and I shall re-read "Master Eckhart, not only for the purpose of your problem, but "also for my own work in the line of religio-philosophical investi- "gations."

The quotations of Professor Eucken are as follows:

Clemence of Alexandria (teaching since 189 A. D., *Strom.* IV., 22, 136):

χρείας τινὸς ἕνεκεν, ἵνα μοι τόδε γένηται καὶ τόδε μὴ γένηται, τῆς ἐπιστήμης ἐφιέσθαι τῆς περὶ τὸν θεὸν οὐκ ἴδιον γνωστικοῦ, ἀποχρῆ δ'αὐτῷ αἰτία τῆς θεωρίας ἡ γνῶσις αὐτή. τολμήσας γὰρ εἰπομ' ἄν, οὐ διὰ τὸ σώζεσθαι βούλεσθαι τὴν γνῶσιν αἱρήσεται ὁ δι' αὐτὴν τὴν θεῖαν ἐπιστήμην μεθεπῶν τὴν γνῶσιν.

(It does not behoove a gnostic to pursue a comprehension of God for the sake of some gain, that "this may happen to me," and that "that may not befall me." The knowledge itself suffices him as a cause for study. Indeed, I would boldly declare that he who seeks the gnosis for the sake of the divine comprehension itself, pursues the gnosis not even for the sake of being saved.)

Eusebius (fourth century), the father of church history, describes the characteristics of Christian ethics as follows (*Præparat. evang.*, I., 4):

τὸ πᾶν γένος παιδείαν παιδεύεσθαι ἐνθεὸν καὶ εὐσεβῆ, φέρειν τε μανθάνειν γενναίως καὶ βάθει φρονήματι τὰς τῶν ἐπανισταμένων ὑβρεῖς καὶ μὴ τοῖς ἴσοις τοὺς φαύλους ἀμύνεσθαι, θυμοῦ δὲ καὶ ὀργῆς καὶ πάσης ἐμμανοῦς ὀρέξεως κρείττους γενέσθαι· ναὶ μὴν καὶ τῶν ὑπαρχόντων ἀποροῖς καὶ ἐνδεέσι κοινωνεῖν, πάντα τε ἀνθρωπον ὁμογενῆ δεξιοῦσθαι καὶ τὸν νενομισμένον ξενὸν ὡς ἂν νόμῳ φύσεως οἰκειότατον καὶ ἀδελφὸν γνωρίζειν.

(That the whole human race might receive a divine and pious education, and that it might learn to bear nobly and with a profound mind the wrongs of adversaries, and that it would not defend itself against the bad with their own bad methods, that they should master wrath, and hatred, and all wild passion, that they should also communicate of their affluence to the poor and the needy; that they should esteem all mankind as kin, and should recognise the so-called strangers by a law of nature as a neighbor and a friend.)

Augustinus (354–430) in *De vera religione*, 47, says:

"Verissime atque certissime invictus homo est, qui cohæret Deo, non ut ab eo aliquid boni extra mereatur, sed cui nihil aliud quam ipsum hærere Deo bonum est."

(Truly and most assuredly, that man is invincible who hangs together with God, not for the purpose of earning something good, but to whom there is nothing good but the hanging together with God.)

Augustinus (*Retractationes*):

"Ipsa res quæ nunc Christiana religio nuncupatur, erat apud antiquos nec defuit ab initio generis humani, quousque ipse Christus veniret in carne, unde vera religio, quæ jam erat, cœpit appellari Christiana."

(That which now is called the Christian religion existed among the ancients

and was never absent from the beginning of the human race until Christ himself appeared in the flesh, since when the true religion which already existed began to be called Christianity.)

Augustinus (edition of the Benedictines):

"Quod fit a te ipse facit in te. Nunquam fit a te, quod non ipse facit in te. Sed aliquando facit in te, quod non fit a te; nunquam autem aliquid fit a te, si non facit in te." (V., 227, C.)

(What happens of thee, He Himself (God) works in thee. Never anything happens of thee which He Himself does not work in thee. But sometimes He works in thee that which is not done by thee. Yet never is anything done by thee unless He works it in thee.)

Dionysius Areopagita (fifth century):

τὸ εἶναι πάντων ἐστὶν ἡ ὑπὲρ τὸ εἶναι θεότης. (*De Cælesti hierarchia*, 4.)

(The being of all is the divinity above all being.)

ὁ θεῖος ἔρως ὡσπέρ τις ἀίδιος κύκλος. (*De divinis nominibus*, IV, 14.)

(Divine love is like an eternal circle.)

πᾶσα δυὰς οὐκ ἀρχὴ, μόνας δὲ ἐσται πάσης δυάδος ἀρχή. (§ 21.)

(Duality is never a principle. A unity is always the principle of every duality.)

αὐτός ἐστι (viz., God) τὸ εἶναι τοῖς οὖσι· καὶ οὐ τὰ ὄντα μόνον, ἀλλὰ καὶ αὐτὸ τὸ εἶναι τῶν ὄντων. (5, § 4.)

(He Himself (viz., God) is the being of all beings, and He is not only the beings but also the being of the beings.)

καὶ γὰρ οὐ τόδε μὲν ἐστι (God), τόδε δὲ οὐκ ἐστιν· οὐδὲ πῆ μὲν ἐστι, πῆ δὲ οὐκ ἐστιν, ἀλλὰ πάντα ἐστὶν, ὡς πάντων αἴτιος. ....διὰ καὶ πάντα αὐτοῦ καὶ ἅμα κατηγορεῖται, καὶ οὐδέν ἐστι τῶν πάντων. (5, § 8.)

(For indeed, not is He [God] this and that is He not. And not is He in this way and in that way is He not; but He is all as the causer of all. Therefore, all is predicated at the same time of Him, and He is nothing at all.)

Scotus Erigena (ninth century), edition of Migne, *De divisione naturæ*:

"Cum ergo audimus, Deum omnia facere, nihil aliud debemus intelligere, quam Deum in omnibus esse, hoc est, essentiam omnium subsistere. Ipse enim solus per se vere est, et omne quod vere in his quae sunt dicitur esse, ipse solus est." (I., 518, A.)

(When we are informed that God does everything, we must understand that God is in all things, that is to say, He is the essence of all. He alone, indeed, exists in the truth, and everything which in the things is truly called being, is He Himself alone.)

"Merito ergo amor Deus dicitur, quia omnis amoris causa est et per omnia

diffunditur et in unum colligit omnia, et ad se ipsum ineffabili regressu resolvitur." (519, D.)

(Justly, therefore, is God called love, because He is the cause of all love and is diffused through all things, collects all things into one, and is resolved again in an ineffable regress to himself.)

Finally, "in eo [God] omnia quieta erunt, et unum individuum atque immutabile manebunt." (527, B.)

(In God all things will be put to rest and remain one, indivisible, and immutable.)

Scotus Erigena says that God

"non intelligit quid ipse sit." (II., 590.)

(God does not perceive what he is himself.)

"Et creari et creare conspicitur divina natura. Creatur enim a se ipsa in primordialibus causis, ac per hoc se ipsam creat, hoc est, in suis theophaniis incipit apparere, ex occultissimis naturae suae finibus volens emergere, in quibus et sibi ipsi incognita, hoc est, in nullo se cognoscit, quia infinita est, et supernaturalis et superessentialis et super omne, quod potest intelligi et non potest, descendens vero in principiis rerum ac veluti se ipsam creans in aliquo inchoat esse." (III., 689a.)

(The divine nature manifests itself as being created as well as creating. It is created by itself in primordial causes and therefore it creates itself, that is, it begins to appear in its theophanies. Longing to emerge from the most hidden realms of its own nature in which it is unknown to itself, that is, it does not understand itself in nothing, because it is infinite and supernatural and superexistent and above everything which can and cannot be understood, descending indeed down to the principles of the things, and, as it were, creating itself, it begins to exist in something.)

"Qui perfecte vivit, omnino corpus suum et vitam, qua illud administratur, omnesque corporeas sensus non solum spernit, verum etiam quantum potest et corrumpit et destruit." (IV., 753 B.)

(He who leads a perfect life has not only an utter contempt for his body and the life by which the body is sustained, and all corporeal senses, but also destroys and annihilates them as much as he can.)

Master Eckhart (born about 1260, died 1327; see *Deutsche Mystiker*, by Pfeiffer, Vol. II.):

"Und alsô ist daz wort Augustini ze verstên, daz er sprichet: waz der mensche minnet, daz ist der mensche. Minnet er einen stein, er ist ein stein; minnet er einen menschen, er ist ein mensche; minnet er got—nû getar ich niht für baz gesprechen, wan sprêche ich, daz er got danne wêre, ir möhtet mich versteinen. Aber ich wîse iuch ûf die geschrift." (199, 3.)

(And in this way the word of Augustine must be understood when he says:

"What a man loveth, that he is. If a man loveth a stone, he is a stone. If he loveth a man, he is a man. If he loveth God—now I do not dare to speak further, for if I say that he then is God you might stone me, but I refer you to the Scriptures.)

"Got und ich, wir sîn ein mit bekennen" [=erkennen]. (206, 8.)

(God and I, we are one in understanding.)

"Sol diu sêle got erkennen, sô muoz si ouch ir selber vergezzen unde muoz sich selber verlieren; want als si sich selber siht und erkennet, sô siht noch erkennet si got niht. Als si sich durch got verliuret und alliu dinc verlât, sô vindet si sich wider in got." (222, 37.)

(If the soul is to comprehend God, it must forget itself, for if the soul sees and comprehends itself, it neither sees nor comprehends God. If the soul loses itself through God and forsakes all things, it finds itself again through God.)

"Bin ich sêlic, sô sint alliu dinc in mir unde got, unde swâ ich bin, dâ ist got, sô bin ich in gote, unde swâ got ist, dâ bin ich." (32, 12.)

(If I am blest, then all things are in me and God also. And wherever I am, there is God. Thus am I in God and wherever God is there I am.)

"Swenne diu sêle dar zuo kumt, daz si sich vereinet mit dem schepfer, sô verliuret si ira namen, wand got hât si in sich gezogen, alsô daz si an ir selber niht enist, als [wie] die sunne daz morgenlieht [Morgenroth] in sich geziuhet, daz ez ze nihte wird." (513, 20.)

(Whenever the soul comes to uniting itself with the Creator it loses its own name, because God has drawn it to himself in such a way that it is nothing in itself, as the sun draws in the morning red, that it becomes annihilated.)

"Ihr sult wizzen, das alle unser vollekomenheit und alle unser sêlikeit lît dar an, daz der mensche durchgange und übergange alle geschaffenheit und alle zîtlicheit und allez wesen und gange in den grunt der gruntlôs ist." (619, 25.)

(Ye should know that all our perfection and all our bliss consists in this that man penetrates and transgresses everything created, everything temporal, everything existent, and enters into the ground which is groundless.)

"Der in allen steten ist dâ heime, der ist gotes wirdic, unt der in allen zîten blîbet eine, dem ist got gegenwürtic, und in deme sint geswigen alle crêatûre, in deme gebirt got sînen einbornen sun." (598, 21.)

(He who is at home in all places, is worthy of God, and to him who in all times remains one, God is always present, and in him to whom all creatures have been silenced, God begets his only begotten son.)

"Daz hoehste, dâ der geist zuo komen mac in disem lîbe, daz ist, daz er eine stête wonunge habe ûzer all in all. Daz er wonen sol ûzer all, daz ist daz er wonen sol in einer abgescheidenheit und in einer blôzen lidekeit [=Ledigkeit] sîn selbes und aller dinge. Daz er aber wonen sol in all, daz ist, daz er wonen sol in einer stêten stilheit, daz ist: in einer înswebunge [=Entschlafen] in sînem êwigen bilde, dâ aller dinge bilde in einer einvaltekeit liuhtet." (600, 31.)

(The highest to which the spirit can attain in this body is, that he may have

an abiding dwelling outside of all, within all. That he should live outside of all, means that he should live in seclusion and in a pure state of being rid of himself and of all things and that he should live within all means, that he should live in a constant stillness; it means a going to sleep [?] in his eternal image in which all things, the images of all things are illumined in simplicity.)

Eckhart says about those who are born again in the spirit:

"Sie sint lidig [ledig] der dinge unde schouwent den spiegel der wârheit unde sint unwizzent dar zuo komen: sie sind ûf ertrîche, ir wonunge ist aber im himelrîche, unde sie sint gesetzet in ruowe; sie gânt her für als die kleinen kint." (601, 4.)

(They are rid of the things and behold the mirror of all truth. And they have come to it unknowingly. They are on earth but their dwelling is in heaven. They are placed at rest, but they walk about like little children.)

"Dâ stirbet der geist alsterbende in dem wunder der gotheit, wan er in der einekeit enhât kein underscheit; daz persônliche verliure sînen namen in einekeit." (517, 1.)

(There the spirit dies, dying away in the miracle of Godhood, for in the oneness with God he possesses no discrimination The personal loses its name in oneness.)

He describes the merchants in the temple as those who demand wages:

"Alle die wîle der mensche ihtes iht suochet in allen sînen werken oder iht begert von allem dem, daz got gegeben mag oder noch geben wil, sô ist er disen koufliuten gelîch." (35, 1.)

(So long as man longs for anything in his works or desires anything of that which God has given or not given, he is like unto these merchants who demanded wages in the temple.)

"Ich wil lieber in der helle sîn unde daz ich got habe, denne in dem himelrîche, und daz ich got niht enhabe." (624, 5.)

(I prefer to be in hell if I only have God, than to be in heaven without having God.)

"Ich spriche wârlich: al die wîle dû diniu werc wirkest umbe himelrîche oder umbe got oder umbe dîn êwige sêlikeit von ûzen zuo, sô ist dir wârlich unreht." (66, 6.)

(I speak in truth: so long as you do your work for the sake of heaven or for the sake of God, or for the sake of your eternal salvation externally, you are truly on the wrong path.)

"Got wirket sunder warumbe und en hât kein warumbe." (146, 20.)

(God worketh without a wherefore, and he has no wherefore.)

"Swenne si [die Seele] danne gesamenôt [gesammelt] wirt in die oberôsten kraft, sô wirt si vergeistet, und swenne denne der geist haftet an gote mit ganzer

einunge des willens, sô wirt er vergotet. Danne allerêrst sô ist er in der wâren anbetunge." (240, 11.)

(Whenever the soul will be gathered into the highest force, it will be transfigured, and when thus the spirit clings to God with an entire unity of will, it will be deified. Then only man will be in true worship.)

Noteworthy are the passages 466 ff., on the nobility of the soul (418 ff.), and of the birth of the eternal word in the soul (574, 22). He says:

"Diu hoehste hôcheit der hoehe diu lît in dem tiefen grunde der dêmüetikeit." (574, 22.)

(The highest highness of the height lies in the deepest abyss of humility.)

"Diu tiefe unde diu hoehe ist einz." (26.)

(Depth and height are one.)

"Wie sol der mensche sîn, der got schouwen sol? Er sol tôt sîn. Unser herre sprichet: nieman mac mich gesehen unde leben."—106, 37.

(How shall that man be who shall behold God? He shall be dead. Our Lord says: "No man may see me and live.")

"Als verre dû niht enbist an dir selben, als verre bistû alliu dinc und ungescheiden von allen dingen, und als verre dû ungescheiden bist von allen dingen, als verre bist dû got und alliu dinc."—163, 8.

(So far as thou art nothing of thine, thou art all things, and unseparated from all things. And as thou art unseparated from all things, thou art God and all things.)

"Got wirt und entwirt."[1] 180, 18.

(God becomes and is ceasing to be.)

"Niene [nirgend] ist got als eigenlich got als in der sêle. In allen creâtûren ist etwaz gotes, aber in der sêle ist got götlich, wan sie ist sîn ruowestat.—230, 36.

(Nowhere God is really God except in the soul. There is something of God in all creatures, but in the soul God is godlike. For, the soul is his dwelling place.)

"Ich sage iu bî der êwigen wârheit, als lange ir willen hânt ze erfüllende den willen gotes und iht begerunge hânt der êwikeit unde gotes, alsô lange sint ir nicht rehte arm; wan daz ist ein arm mensche, der niht enwil noch niht bekennet noch niht begert."—281, 16.

(I declare to you by the eternal truth that so long as you have still a desire to fulfil the will of God, so long as you are anxious for eternity and for God you are not yet truly poor (viz., poor in spirit), for he only is a poor man who wants nothing, knows nothing, and desires nothing.)

"Dû solt alzemâle entsinken dîner dînesheit unde sol dîn dîn in sînem mîn ein

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[1] By the bye, *entwerden* is very rare in Eckhart.

mîn werden alse genzlich, daz dû mit ime verstandest êwicliche sîne ungewordene istikeit [= *essentia*] unde sîne ungenanten nihtheit."—319, 18.

(Thou shalt altogether sink away from thine thinehood. And thy thine shall in His mind so entirely become a mine, that thou altogether with Him eternally seizest His uncreated beinghood, and His nameless nothinghood.)

"'Wie sol ich in [viz. Gott] denne minnen?' Dû solt in minnen als er ist: ein nihtgot, ein nihtgeist, ein nihtpersône, ein nihtbilde, mêr [= vielmehr]: als er ein lûter pûr klâr ein ist, gesundert von aller zweiheite, und in dem einen sülen wir êwigliche versinken von nihte zuo nihte."—320, 27.

(How shall I love him (viz., God)? Thou shalt love Him as He is, a not God, a not spirit, a not person, a not image; but rather as He is, a true, pure, clear One, separated from all twohood, and in this One we shall eternally disappear from nothing into nothing.)

"Darumbe heizet man die einekeit niht, want der geist enkan keine wîse vinden, waz si sî; mêr: daz der geist enpfindet, daz er enthalten wird von eim andern dan daz er selber ist."—519, 20.

(Therefore one calls onehood, nothing, because the spirit can in no wise find what it is. The spirit rather perceives that it is contained in something else which it (the spirit) is itself.)

"Allez unser wesen lît an nihte denne an einem nihtwerden."—574, 33.

(All our being relies on nothing but on becoming nothing.)

"Sîn [viz., man's] wesen unde sîn ûfenthalt ist, wie er das unbegrîfenliche wesen verstande mit einer frîen ledigen vernunft als sîn eigen wesen, und darumbe wirt im diu wunderheit des *vernihtenden nihtes* unverborgen."—583, 14.

(Man's nature and his task is how he may understand the incomprehensible essence with a very untrammelled reason, as his own essence, and thus only the wonder of the annihilating nothing will be revealed to him.)

"Wâ zwei ein süllent werden, dâ muoz daz ein sîn wesen verliesen. Alsô ist; sol got unde diu sêle ein werden, sô muoz diu sêle ir leben und ir wesen verlieren,"—32, 30.

(Wherever two shall become one, there one of them must lose its own nature. Therefore, shall God and the soul become one, then soul must lose its life and its nature.)

"Ez enmöhte niemer gesîn, daz ez ûz gebrechen möhte, ez enwêre vor dar inne gewesen in der lûterkeit, in dem swebenden wesenne. Der wîn ist in der reben, und ist niht darinne und ist doch darinne."—194, 32.

(It could never happen that it (anything) might come out except it has been in it before in the purity of the continuous being; the wine is in the grapes and is not in them, and yet it is in them.)

"Nâchvolgen dem vergoteten menschen Kristô."—643, 19.

(We must follow Christ, the man who has become God.)

"Ein vergoteter[1] mensche."—643, 38.
(A deified man.)

This collection of passages communicated by Professor Eucken might, as he says himself, be considerably increased, but they are sufficiently characteristic. We limit further quotations to a few passages which F. Max Müller introduced in his famous novelette *German Love*. Angelus Silesius says:

"Wir beten: 'Es gescheh', mein Herr und Gott, dein Wille,'
Und sieh, er hat nicht Will', er ist ein' ew'ge Stille."
[We pray: "Thy will, my Lord and God, be done,"
And lo, He has no will! He is an eternal silence.]

"Ruh' ist das höchste Gut, und wäre Gott nicht Ruh',
Ich schlösse vor ihm selber mein' Augen beide zu."
[Rest is the highest good, and were God not rest
Then would I avert my gaze even from Him.]

Another quotation of deep interest is selected from the *Deutsche Theologie*, a Middle High German work written by an unknown author. It reads as follows:

"Und wa die voreinunge geschicht in der wahrheit und wesentlich wirt, da stet vorbass der inner mensche in der einung unbeweglich und got lest den ussern menschen her und dar bewegt werden von diesem zu dem. Das muss und sol sin und geschehen, dass der usser mensche spricht und es ouch in der wahrheit also ist, 'ich will weder sin noch nit sin, weder leben oder sterben, wissen oder nicht wissen, tun oder lassen, und alles das disem glich ist, sunder alles, das da muss und soll sin und geschehen, da bin ich bereit und gehorsam zu, es si in lidender wise oder in tuender wise.' Und alsoe hat der usser mensch kein warumbe oder gesuch, sunder alleine dem ewigen willen genuk zu sin."

[And when the union (with God) takes place in truth and becomes real, then the inner man stands henceforth immovable in the union, and God permits the outer man to be driven hither and thither, from this to that. It must and shall be and happen that the outer man says—and is so also in truth—'I will neither be nor not be, neither live nor die, neither know nor not know, neither do nor leave undone—and everything which is similar to this, but I am ready and obedient to do everything which must and shall be done, be it passively or actively.' And thus has the outer man no question or desire but to satisfy only the Eternal Will."

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1 *Vergotten* is extremely rare in Eckhart and these passages may for that reason have to be attributed to a later redactor of his writings. I must add that Eckhart's works have not as yet been critically sifted, and the text will probably need emendation and the removal of spurious additions.

It was a natural phase in the development of the Church that its doctrines hardened into dogmas. Nor can the formulation of dogmas be regretted, for if the Church had no dogma, in the sense of clearly formulated doctrine, its mission would be gone. All dogmas are symbols; they express truths which, when stated abstractly, are difficult to comprehend in concrete allegories; and dogmas are not in themselves injurious, they become injurious only when by a misinterpretation of their nature the symbol is literally believed in and all attempts at comprehending its significance is abandoned.

The philosophy that underlies Christianity is deep enough for profound thinkers, but the field remains fallow. Professor Eucken says:

"Upon the whole, the Catholic Church has less prejudice against these views than orthodox Protestantism."

This is true, for Protestant theology as a rule clings more sternly to the letter and discourages speculation, because it endangers the literal belief in the dogma; but the Roman Church, in spite of its greater breadth in this particular line, has not in recent times produced anything remarkable, because their thinkers are allowed a wider range of freedom only in purely theoretical questions which will not endanger papal authority or switch off into the evangelical conception of individual responsibility and independence of judgment in matters of conscience.

Among modern Protestant theologians who endeavored to take a broad view of Christianity we mention the Prelate Karl Gerock, the poet of many beautiful songs. He belonged to the orthodox party of Württemberg where he was a leader and one of the highest ecclesiastical dignitaries. Although known as orthodox, he incurred the displeasure of many of his over-pious brethren who regarded breadth of thought as unchristian, and scientific research as a worldly pursuit. Gerock's reply to these accusations, which stirred him deeply, took the shape of a hymn entitled "I Rue It Not," whose clarion notes sound like a call to arms against all narrowness that clothes itself in the mantle of piety. Since the poem is almost unknown in English-speaking countries, we quote it in

full in an English translation which was made at the writer's special request by Mr. E. F. L. Gauss of Chicago, a personal friend of the late Prelate Gerock:[1]

I RUE IT NOT.

1 Cor., 3, 22, 23.

Much I will rue when at my grave's dark portal
And I look back upon my pilgrimage;
Thoughts, words, and actions as of every mortal
Their accusations 'gainst my soul allege.
When then thine eye, O Judge, is through me flaming,
Not judgment, Lord, but mercy be my lot!
Yet much, my friends, that strictly you're condemning,
—I rue it not.

I rue no sentence that was mildly spoken
Where brother brother weighed upon the scale,
When I did hope where you the staff had broken,
And honey found where others poison hail.
And were my hopes too bold, too mild my sentence:
In Heaven is He who still must judge our lot;
No more I hope than through his grace an entrance,
—I rue it not.

I rue no path on which my spirit entered
In science' service solemnly and deep,
When I on wings of heavenly gifts have ventured
On high, while you have passed your time in sleep.
What though around the light the path was winding,
Not leading back till after hours hot:
Who seeks aright alone aright is finding;
—I rue it not.

I rue no song in friendly circle chanted,
Or quietly enjoyed in nature's dome,
When a poetic dream held me enchanted,
A short and golden dream of spirit's roam.
And though a church-tune I'm not always raising,

[1] Mr. Gauss, formerly a Lutheran clergyman, now Assistant Librarian of the Public Library of Chicago, is well known among his personal friends as a rarely gifted translator. The present English version of Gerock's poem "Ich reu' es nicht," which is the first translation ever made, preserves the metre of the original and is a faithful production of the poet's sentiments.

Though 't be a song Homer, Shakespeare begot:
In nature's temple, too, all God is praising;
—I rue it not.

I rue no day when I for many an hour
By the great beauty of God's world was charmed,
Fanned in the storm by his almighty power,
And in the sunshine by his favor warmed.
And though I served him not where men are preaching,
Though not for duty's sake this task was sought:
My Saviour on the mountains, too, is preaching;
—I rue it not.

I rue no mite which I in town or borough—
Unheeding—on the poor or sick bestowed,
That o'er a face, so sad and pale with sorrow,
A passing smile like heaven's sunlight flowed.
And though I oft my bread cast on the water:
E'en God in heaven feeds full many a sot;
A single rogue does not make me man's hater,
—I rue it not.

I rue no tear I shed, my heart exposing,
At foreign pain, or in my own dark nights,
When others, manlier, their hearts were closing,
And stood unmoved on faith's dispassioned heights.
And is it human that the human sorrows
Will moist mine eye and find my heart's soft spot:
My Jesus, too, wept with earth's stricken mourners,
—I rue it not.

That I a thousand times the Lord have queried
Where lovingly his spirit bade: believe!
That of his grace I many talents buried,
That, friends, I rue, that truly makes me grieve;
But that as Christian I a man remainéd,
And boldly viewed what's human on the spot,
In suff'ring, faith, love, hope a man unfeignéd;
—I rue it not.

Christian speculation, wherever it asserted itself, has remained mystical not only because the Churches have discouraged scientists and men of clear thought to attack the problem of Christian phi-

losophy, but mainly because there is a lingering influence of the Neo-Platonic emanation-theory left in Christian speculation, which by materialising that which is spiritual renders the conception of spirit obscure. If the Christian mystics had only clearly grasped the idea of the Logos, if they had understood that the word is the bread of life, that spirit originates through and lives in words, in language, they could have freed themselves of the thought that the soul is a being, or an entity, or a substance, and that the spiritual is an emanation from God.

The emanation-theory was always a favorite idea with Christian mystics. But the emanation idea is a mere allegory, for the soul does neither flow nor migrate. The soul is form, and the most important parts of the human soul are the significance-bearing forms of speech which contain in the simple shape of words eternal truth that can be communicated to others, and are thus transmitted from generation to generation. If the mystics had understood the spiritual nature of form, and further, the law of the preservation of form, they would have caught fuller glimpses of the truth and might have overcome their mysticism. Instead of seeing the solution of their philosophical problems as through a glass darkly, they might have acquired a clear and scientific comprehension of the nature of the spiritual as it manifests itself in both, the deity and the incarnations of the deity, the eternal and the embodiment of the eternal, in man, God, and the soul.

EDITOR.

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M. DE ROBERTY resumes and develops in his *L'Éthique, le psychisme social*, the second of his series of works on ethics, certain fundamental theses which we already know. Morals find in his opinion their explanation in the bio-sociological doctrine, which he substitutes for the incomplete vitalistic doctrine. The relations of life with social conditions ought to be conceived, therefore, as follows: (1) life is organic and physiological, or hyper-organic and social; (2) organic life, in its higher planes, blossoms into cerebral life, and this begins at the precise point where irritability and contractility become sensation, elementary representation, and so-called conscious or reasoned action; (3) social life begins (*a*) with ideation, as this grows more and more complex and more and more bound up with the *ideas of others*, and with (*b*) action, as this likewise grows more complex and is dominated and shaped by the *acts of others*. And here issues forth a new form of cosmic energy constituting what M. Roberty calls *collective psychism* or social existence.

Thus, "ideas and the evolution of ideas form the sole contents, the sole subject-matter of sociology." As to the so-called contradictory notions of good and evil, justice and injustice, M. de Roberty eliminates entirely the difficulty which springs from the idea that the idea of struggle or antagonism is implied in the conservation of organic life. It is only, he says, when altruism has furnished its beautiful results and created the lofty forms of moral life, that individual reason and conscience, the products of collec-

tive reason and conscience, single off the good from the bad, the just from the unjust, order from disorder, and it is then only that through opposition to the positive concepts of union, concord, harmony, the negative concepts of division, of struggle and combat arise. "Such is the upshot," adds the author, "of the law of contrast which rules the simplest and most complicated operations of the mind."

These ideas as a whole, seem to me appropriate to the facts, although certain obscurities of language sometimes hide their significance, and upon the whole my thought accords quite well with that of M. de Roberty. Mr. Lester F. Ward is the writer who is probably nearest him (see for example, Ward's *Psychic Factors of Civilisation*). But it is possible that the deviation is to-day not so great between biological sociology and bio-sociology. No one now refuses to admit that the social fact is a distinct creation, the social individual a new being in some measure, and no one would deny the permanent influence of biological conditions on the evolution of societies. It is true, however, that the preponderating consideration of the one or the other point of view impresses a different stamp upon the science, and this is in itself a sufficient justification of the care with which the two spheres of ideas are distinguished.

I shall speak in this connexion of a very serious book by M. A. SABATIER, *Esquisse d'une philosophie de la religion d'après la psychologie et l'histoire.*[1] M. Sabatier appears to look upon dogmas (and this is the only point on which I shall remark) as variable formulas of an emotion which is always the same. It is not exact in my opinion to say that the religious emotion does not vary, for it is composed of many elements. It is not simple and primitive, and one should not conclude from the fragility of the beliefs in which it has expressed itself in different epochs, the impotence of some stronger and more stable doctrine which might sometime find its response in an entirely new sentiment. The religious sentiment is above all a *consensus* of emotions, and the dominating emotion which

[1] Fischbacher publisher.

gives its color to this consensus has varied in effect according to the genius of the races and individuals possessing it. This view of psychology and of history leads me to look upon the philosophy of religion in a somewhat different light from what M. Sabatier regards it, and it is on this very point that the promise is based of a religious evolution corresponding to the social state of the future.

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M. J. Novicow, in *L'Avenir de la race blanche*,[1] refutes with much vehemence and sound common sense the pessimistic prophecies of certain authors regarding the competition and final inundation of the yellow and even black races upon our civilisation. These so-called inferior races would be fitted, he thinks, to play the rôle now filled by ours, if our race should ever happen to succumb to their overpowering numbers. He holds the view of the virtual equality of the races; the conception of noble races and inferior races does not seem justified to him in the light of what anthropology has done for history. "All depends," he says, "on circumstances, on the environment, on historical conditions, and not at all upon the ethnical elements." But M. Novicow who has pushed his thesis to an extravagant point here overlooks the very important fact that the peoples themselves have in a great measure produced this environment and these conditions and that they have prepared the way for the circumstances which subsequently intervene and affect their destiny. In any event the part played by accident is almost entirely eliminated if we consider, for example, the parallel evolution of England and France since the seventeenth century. This evolution shows in marked degree the genius of widely different peoples, differently endowed races, and we cannot imagine the substitution of the one for the other without completely upturning the course of events. Each of these peoples has actually created the conditions which have determined its subsequent history.

M. Novicow considers the hypothetical question of what would have happened had Carthage vanquished Rome. But this kind of reasoning is not permitted. One cannot base a demonstration upon

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[1] F. Alcan, publisher.

hypothetical events which were precisely the events that were not realised. I admit that "race and civilisation are not associated by the bonds of cause and effect," if we understand thereby "anthropological" race. But this formula is subject to rectification if we understand by race "historical" race, that is to say, a social group which has acquired superiority at some given moment by virtue of complex conditions which it is the task of the historian to analyse as he best can in each case.

M. EDMOND DEMOLINS starts from an almost contrary thesis in a work which, though in other respects deficient, has created considerable notice in France, entitled *A quoi tient la supériorité des Anglo-Saxons.*[1] For M. Demolins the superiority in question is to be attributed to race, not the natural, primitive race, with which he is scarcely concerned at all, but the composite race, the group of men such as we find it already formed at a given moment and occupying a given geographical area. Race, so understood, is not distinguished by anthropological characters. It shows itself in deep-lying psychological traits, in a sum of well-defined tendencies culminating in positive institutions. The particularist tendency seems to dominate among the Anglo-Saxons, whilst among the Latins, the Germans, and the Slavs, the tendency is to create communal societies having either the family or the state for its basis. In the history of England M. Demolins shows the well-defined contrast between institutions imported by the Normans and the indigenous population of the country. This interesting comparison, which is based upon numerous proofs, serves to render many other facts plain. He explains, for example, the poor success in England and in the United States (excepting here the German communities on the American Continent) of the socialistic propaganda which is so widely spread in Germany, Italy, France, Spain, etc.

We have here, in fine, a sort of philosophy of history with economical foundations, and this philosophy is closely connected as a whole with the studies which were evoked by the late M. Le Play and which furnished for twelve years or thereabouts the ma-

[1] Didot, publisher.

terial of one of the best special Reviews of this subject, namely *La Science Sociale*, well known in America.

We have another work of the same class in M. CH. ANDLER'S *Les origines du socialisme d'état en Allemagne.*[1] "Individual liberty cannot flourish except in the bosom of a society in which justice prevails, and therefore we cannot lay upon individual liberty the responsibility of realising justice." Such is the fundamental proposition of state socialism. M. Andler (I restrict myself to merely pointing out the main features of his exhaustive study) seeks its origin in the writings of Hegel, Savigny, Gans, Lassalle, Rodbertus, Thünen, List, and expounds with great sagacity the theories propounded by these different masters regarding the law, production, and distribution of wealth, reserving for a subsequent volume the discussion of practical questions. He well shows the decisive influence of ideas upon political events in Germany. "Germany," he writes in an introduction, "will certainly be socialistic in the next generation. Will it be democratic also? Can we alter the social condition of individuals without modifying at the same time and in the same direction their political rights. This is the problem which the immediate future will have to solve. We can only wish that it might already have been determined."

The first question is perhaps to ascertain whether a socialistic Germany would succeed in prolonging its existence. For if state socialism is not the system which best favors production, it is also not that which will assure the most happiness or even the most justice, and if it is besides an anachronism the experiment is in danger of having lamentable results.

* * *

In the *Psycho-physiologie du génie et du talent*[2] of M. MAX NORDAU, we enter upon an entirely different subject. It is a valuable book and full of interesting *aperçus* which merit notice. I shall, however, restrict myself to the two central propositions of the

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[1] This work and all others where the publisher's name is not specially mentioned, are published by Alcan.

[2] Traduction par A. Dietrich.

author regarding genius and heredity. M. Nordau first seeks to distinguish genius from talent. He sees between the two, not a simple quantitative difference, but above all a qualitative difference. "The average man—and talent falls here—" he says, "never sees the world itself but only its reflex in the eyes of genius. Genius alone is capable of forming something from the raw materials which the world furnishes, and afterwards men feel, judge, and act as the genius has felt, judged, and acted. Genius reposes upon an innate organic development, upon the perfection of the higher and exclusively human centres; talent upon the manifestation, acquired or strengthened by exercise, of natural dispositions existing in the constitution of a given race."

Several consequences follow. In the first place, the rejection of the doctrine of Lombroso which likens genius to insanity. M. Nordau, and I think he is right on this point, abandons artistic pseudo-geniuses to the alienist. But true geniuses are for him neither diseased nor degenerate. "Genius," he writes, "is evolutionary. It is the first appearance in an individual of new functions and without doubt also of new or modified brain-tissues destined, perhaps, to become typical for the whole species. Now, where is there any example of a new formation of the pathological order being evolutionary in character?" Doubtless so high a form of life is extremely fragile, but *a priori* genius is no more psychosis than athleticism is cardiopathy because the latter disease is common to great athletes.

The argument of the work is striking, although it rests partly upon the peculiar hypothesis of the author which I do not accept in its entirety. It seems to me prudent to speak of *modified* rather than of *new* tissues. In any event, the necessary distinction between genius and talent, difficult though it be at times, and profound as we may conceive it, does not seem to me to demand either that the man of genius should show from the outset a new function (and such a function could only have developed in the human species through hereditary acquisitions), or that the man of talent—poet, musician, or eminent painter—should not have certain qualifications which lift him clearly above the level of mediocrity.

"A powerful development of the centres of *reason* and of *will*—there," says M. Nordau, "lies the organic basis of the phenomenon we call genius." But talent, too, can dispense with neither will nor judgment; and the difference between the two, if reduced to a mere state of development of this or that nervous centre, would consequently seem quantitative. Still, M. Nordau remains none the less authorised to establish a new scale of genius "determined by the dignity of the tissue or of the organ upon the exceptional perfection of which it reposes." The man of judgment and action together, a Mohammed, a Napoleon, is placed in the first rank here. The thinkers come afterwards, the artists occupy the last place. These last scarcely merit the title of genius, for they are men of emotion and not of thought. I am not of those whom this view will startle. I share it and have insisted on it many times—upon the weak intellectual quality of artists in general as well as upon the excessive importance which is ascribed to them. I shall not prolong this discussion, however, but proceed to heredity.

The primitive law, M. Nordau maintains, is not heredity, but a sort of vital choice or liberty between all possible variant forms. This liberty of life limits heredity, that is to say, the resemblance to the ancestral form, and it also explains (this view is remarkable) the adaptation of organisms which is incomprehensible in the Darwinian theory. The primitive vital law implies the difference and the autonomy of individuals; consecutive heredity implies resemblance and dependence. Not believing in talent as in something preformed in the organism, M. Nordau also does not believe in heredity. Without doubt it is a disputable question that the son inherits in a mass the preformed constitution or stock of qualities which are going to make him a poet, painter, or musician. Example and education in childhood determines the vocation in many cases. It is true, however, that the profession of any art which is followed with any degree of superiority supposes at least the highest possible delicacy on the part of some particular nervous centre (hearing, for example, in musicians), and the quality of a perfect nervous apparatus can be transmitted, so creating the possibility of a subsequent development or of easier exercises. Thus heredity

would transmit the special qualities of which the spontaneous or acquired vocation would be constituted—the initial subject-matter of future education in some sort. And what matters it if these qualities, these aptitudes, find a different employment and come into some other constitutional arrangement! They have been none the less transmitted. Within these limits the theory of heredity remains defendable and still of great importance.

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M. Enrico Ferri gives us an extremely interesting work in his *Les criminels dans l'art et la littérature*,[1] a study of the criminal such as poets and artists have pictured him. I shall make but one observation on the subject of Orestes and Hamlet. M. Ferri sees in Orestes a criminal by passion, in Hamlet a criminal by insanity. Be it so. But we should not forget that the creation of Orestes was due primarily to a fact of the moral order: the Greek poets sought to effect a compromise between the ancient legend and the conscience of their times. I have shown this with sufficient evidence in my book *La morale dans le drame*, although I was unfortunately not well conversant with the facts of psychiatry when I published the first edition of this book eighteen years ago, and even in the second edition it was not sufficiently revised with regard to these facts.

A similar observation for Hamlet. If these two heroes placed in a like situation in different times have not the same character, it is all the more reason for our admiring the profound art of Shakespeare and of the Greek tragic poets. According to the ancient law, Orestes was constrained to kill his mother, and the ancient tragedy made him an impulsive person who was still capable of remorse, as M. Ferri tells us. According to the modern law, Hamlet was bound to spare his own mother, and Shakespeare made of him a person "insane with doubt," as M. Ferri phrases it, although the simple "melancholic type" which M. George Dumas recently portrayed for us might be equally applicable to him. Each poet has chosen the type which best suits the historical and moral situation

[1] Trad. Eug. Laurent.

of his hero, and he has treated it on the basis of personal observations more or less exact, but without thinking exclusively (I say this rather of Eschylus and Sophocles) of depicting a person that is diseased. That is why the interpretation of Hamlet appears to me more difficult than that of Macbeth for example, and I should still have some hesitation in accepting outright the explanation of the learned author to whom I submit this slight criticism.

L. ARRÉAT.

PARIS.

BOOK REVIEWS.

RAUMÄSTHETIK UND GEOMETRISCH-OPTISCHE TÄUSCHUNGEN. Von *Theodor Lipps*. Mit 183 Figuren und einer Tafel. Leipsic: Johann Ambrosius Barth. 1897. Pages, 424. Price, 12 Marks.

Readers of the *Zeitschrift für Psychologie und Physiologie der Sinnesorgane* are already acquainted with the interesting views of Prof. Theodor Lipps of the University of Munich on optical illusions, the æsthetics of spatial form, etc., and all will be glad that the comprehensive researches of this psychological inquirer have now been gathered together into systematic form. Professor Lipps long ago sketched his ideas upon this subject in a memorial which formed part of the *Psychologische Festschrift* prepared in honor of the seventieth birthday of Professor Helmholtz, but owing to lack of time could necessarily do little more than adumbrate the scope and meaning of his new conception. That conception was that the optical and the æsthetic impressions which we receive from geometrical forms are but two several aspects of one and the same thing, and have their common root in the *percepts* which arise in us, of *mechanical* "*activities*." He has sought in the present volume to give to this idea more extended development, to define particularly what these "mechanical activities" are, and to derive from them a systematic theory of geometric-optical illusions. His method, he proclaims, is throughout a psychological as distinguished from a physiological method. Not that he is opposed to the principle of parallelism by which for every psychical phenomenon a corresponding physiological process is sought, but he maintains that the selection of the scientific description which is involved in the employment of either of these methods in preference to the other must be determined by the conditions of the case, and by the prospect which each offers of being more successful. In the present instance, he is unable to do more than to describe the phenomena in question from their psychological side, leaving the other task for further research. As a psychologist he is content to abide by his own department of inquiry, etc.

His claims to success are stated in no uncertain terms. He believes he has absolutely dispatched the problem of geometric-optical illusions, so far as matters of principle are concerned. In points of detail he may have erred, but taking his views as a whole he stakes his pretensions to the least power of scientific thought upon the successful issue of his inquiries. In passing it is to be remarked that he

has waived entirely the application of the theorems of mathematics, claiming that degrees of æsthetic mechanical perception are not measurable, any more than is the relation between the "psychical energy" of the percept and its optical effect. There is moreness and lessness in optical illusions, but their quantitative determination lends nothing to their psychological estimation. We shall endeavor to give by one example a notion of the method and foundation of his inquiry.

The example which Professor Lipps has chosen for his first chapter is that of the Doric column. The Doric column extends vertically upward into space. Its vertical upward extension into space is its peculiar and proper "activity," where, by "activity" is meant "endeavor," "expenditure of force resulting in the accomplishment of something." Antagonistic activity is not wanting here but really exists in the form of gravity, according as gravity is overcome. The downward factor of gravity is as real as the upward factor of extension, the activity which opposes gravity; but the factor by which the column is a column for us, by which, so to speak, it realises its peculiar characteristic existence, is its *upward*, column-constituting tendency. On the other hand, the column extends not only vertically, it extends also horizontally. Here, however, the achievement is not one of extension but one of compression or restriction. If it were not for the horizontal compression, for the horizontal restriction, the column would cease to be a column and would melt away into pure formlessness. Its horizontal extension, too, is in a sense an "activity," but it is not such to the specific extent in which the compressing and restricting factor is an activity. The tendency of the column to expand horizontally is the very tendency which the nature and existence of the column requires should be counteracted and checked. In this sense the restricting or compressing activity of the column is its *peculiar, characteristic* "activity." Taking both things together we discover that the factor which threatens its vertical existence is the same as the factor which threatens its horizontal existence. Gravity can annul both. But the horizontal compression is really the condition precedent of the vertical extension. Because the column is compressed together, for that reason it rises vertically upward in space, for that reason it preserves its essential existence as a column. And herein consists its essential activity. The column is not a thing which crumbles out horizontally beneath the effects of gravity, but it is a form of matter which despite gravity, and overcoming gravity, compresses itself together and rears itself aloft. Its living *activity*, so to speak, is its endeavoring, its struggling aloft. If we surrender ourselves to the sense-impression made by the column, if we ask ourselves what movement is it *on the verge* of performing, what movement is it *endeavoring* to perform, we shall see it growing thinner and thinner in imagination and rising higher and higher in a vertical straight line. The other impression cannot arise in us, and here we have the ground of a well-known optical illusion. We see the column, not with our physical eye, but with the eye of the imagination, ever reaching to a loftier height than it has in reality. We overestimate its height and underestimate its breadth. The sense-perception is correct, but

we have added to it a mechanical interpretation which springs from our emotional, anthropomorphic way of fashioning the world.

We have in this description, as Professor Lipps claims, a psychological fact which has two elements. The form of the column exists, for our perception, as the result of certain mechanical conditions. It not only is, but it becomes, not once, but in every instant anew. We give a mechanical interpretation of the column, not reflectively but immediately, as a matter of direct perception. But the mechanical happening without us is not the only happening involved in this phenomenon. There is also a happening within us to which the outward happening is comparable or analogous. Here, according to the author, is the origin of the notion of all force, of all endeavor in nature, and so in the factors which are at present under consideration the existence of the column as I perceive it appears to me, not by reason of any reflexion, but unconsciously and immediately in the very moment in which I perceive it, not only as conditioned by mechanical causes, but as conditioned by mechanical causes which are *like those underlying my own personal activity*. The column acts as I act when I pull myself together and rise from my seat, or as another human being acts when doing a like thing. I cannot perceive the column without picturing it as invested with the activities which I have experience of in myself.

Now from all this proceeds not the full æsthetic impression made upon me by the Doric column, but certainly a part of that impression. Its rising aloft, its endeavoring, fills me with the same joy as does my own, or as does that of another. I *sympathise* with its behavior, with its method of expressing its intrinsic character and life because I recognise in it a natural joy-giving form of conduct which is my own, and thus the feeling of joyous satisfaction at all spatial forms, and, the author adds, all æsthetic pleasure generally, is a beatifying, pleasure-giving feeling of sympathy.

We are unable for lack of space to follow Professor Lipps into his interesting discussions, many of which are familiar to our readers from former mention. The book abounds in figures, by experimenting with which the reader is lead under the guidance of the author's analysis to a theory of optical illusions and to a theory of the æsthetics of space. The subject is one in which not only the special psychologist is interested, but also the general scientific student, who will have the advantage of being able to make the experiments in question without apparatus or paraphernalia of any kind. The study is one of the widest scope and import, and involves educational elements of considerable significance. *ακρκ.*

EMPFINDEN UND DENKEN. Eine physiologische Untersuchung über die Natur des menschlichen Verstandes. By *Albrecht Rau*. Giessen: Emil Roth. 1896. Pages, 385.

The chief purpose of this volume is to investigate the so-called "law of specific sense-energies" as first enunciated in its simplest form by Albrecht von Haller,

then sharply criticised and seriously modified by Johannes Müller and generally accepted, as thus formulated, by Henle, DuBois-Reymond, Helmholtz, and other authorities in the province of neuro-physiology. This law as stated by Johannes Müller is as follows: "Feeling is not the transmission of a quality or a condition of external bodies to consciousness, but the transmission of a quality or condition of our nerves to consciousness produced by the external world." Thus, he adds by way of illustration, we do not feel the knife which causes us pain, but the condition of our nerves as painful. The mechanical vibration, which according to the undulatory theory produces light, is not in itself a sensation of light, and, even if it could become an object of consciousness, would be the consciousness of a vibration; not until it acts upon the optic nerve as the mediator between the cause and the consciousness is it perceived to be luminous. The vibration of a body is not in itself a tone; the tone begins with the sensation through the quality of the auditory nerve, and the sensory nerve feels the same vibration of the apparently sounding body as a trembling sensation.

Interesting and far-reaching deductions from this theory have been drawn by Jacob Henle, DuBois-Reymond and other representatives of physiological idealism, who maintain that as the operation of our thinking faculty leads us to infer the existence of matter, so the operation of the same faculty may lead us just as logically to infer the existence of spirit; in neither case is our belief based upon direct and positive knowledge. If contact with a knife causes pain, we know that this pain is the expression of our own nerves. Indeed, it is possible, under certain physical conditions, to experience it without any apparent external cause; we then attribute it to some unseen disturbance such as a morbid affection of the tissues or the contact of the air with the nerve of a tooth. In every instance, however, the sensation is purely subjective and the existence of an outward cause is simply an assumption or presupposition. The same is true of colors, tones, scents, and savors, which have no existence outside of ourselves. The number of the properties of matter depends upon the number and acuteness of the senses, the lack of a single one of which is attended with the loss of a corresponding class of properties. Thus color does not exist for the blind nor sound for the deaf, because the nerve-substances, in which vibrations are transformed into color or sound and transmitted to consciousness, are either wanting or wholly inactive. The statement in the Mosaic cosmogony "and there was light" is, as DuBois-Reymond observes, "physiologically false, for there could be no light until there was an organism endowed to some degree with the power of sight. Light began to exist with the development of the first small pigmentary spots, which enabled the infusoria to distinguish it from darkness. It is the substance of the optic and auditory nerves which fills with glowing colors and harmonious sounds the otherwise dark and silent world of ponderable and imponderable matter. This distrust of the testimony of the senses, leading logically to a denial of the existence of the external world, is little more than a revival of the idealism of the eighteenth century, which was already latent

in the philosophical speculations of Descartes and found its fullest and most unequivocal expression in the writings of George Berkeley. The logical consequences of physiological idealism, corresponding to Berkeleianism in metaphysics, have been most clearly drawn and most explicitly stated by DuBois-Reymond's pupil, Prof. J. Rosenthal, who declares that the apparent agreement between our sensations and the external processes, by which they are called forth, is an illusion arising from the use of the same designation for both processes, which have nothing at all in common. Thus the process of a luminous sensation bears no resemblance to the process of vibrations in ether, which produce it, as is evident from the fact that the same vibrations, when they act upon the skin, produce a wholly different sensation, namely, heat. The vibrations of the tuning-fork, for example, will be felt and heard and may also be seen, according as they excite the sensory and auditory and possibly the optic nerves. These vibrations, however, are always the same and have nothing in common with the sensations which they produce. Physical science teaches us that the undulatory motion in ether, which we sometimes call light and sometimes heat, is the same motion. The common division of these physical motions into sound, light, heat, etc., is therefore irrational, because it emphasises as regards these motions an accidental moment, namely, the manner in which they act upon man as a creature endowed with different sensations, but does not apply to magnetic, electric, and other processes, for which a different system of classification is used. "The scientific investigation of the physical processes on one hand," says Rosenthal, "and of the physiological processes of the sensations on the other hand exposes the error, which has taken all the deeper root, because language employs the same words for the different processes and thereby renders it more difficult to distinguish between them."

This theory in its logical consequences as deduced by Rau, discredits the validity of the testimony of our senses and thereby destroys the very foundations on which the natural sciences rest. Thus the knowledge of the mutual relations of bodies, which it is the aim of physics to acquire, depends upon the ability of our senses to receive accurate impressions from the external world and to convey them to the brain where they become objects of consciousness. Suppose, says Rau, that Rosenthal should order an apparatus to aid him in his physiological researches, but should find on trial that it conveyed false impressions and led to incorrect inclusions. Would he continue to use it or would he not rather discard it at once as worthless? Our senses are instruments of investigation, with which nature has endowed us. But what service can they render us if their testimony is untrustworthy? If Rosenthal's idealistic standpoint be tenable, he, as a physiologist, must first get rid of his eyes and ears in order to understand the true nature of light and sound; but instead of doing so, he devises the finest and most complicated instruments for the purpose of increasing his seeing and hearing powers; in other words, he is constantly exercising his inventive skill in adding to the energy and efficiency

of the organs of sense which are constantly deceiving him. His conduct is therefore a complete *reductio ad absurdum* of his theory.

In the second chapter we have a presentation of the views of A. W. Volkmann, Wilhelm Wundt, and other physiologists and physiological psychologists in opposition to Müller's law of specific sense-energies, which is shown to be inconsistent with the facts of biology and the modern theory of descent. Interesting in this connexion are the experiments of Graber, Plateau, and others with worms and reptiles, proving that they distinguish light from darkness by means of the surface of the skin, and Sir John Lubbock's observations of ants and wood-lice, all of which are incompatible with Rosenthal's formulation of Müller's law. The third chapter defines Lotze's attitude to this law and is followed by sections on vitalism and spiritualism, Kant and Lotze, the correct interpretation of Müller's law by G. H. Meyer in conformity with the doctrine of descent, the logical method of natural philosophy, the scientific and speculative significance of conceptions, acoustics with a criticism of Helmholtz's theory of tone-sensations and its influence on other theries, and finally a lucid exposition of the author's philosophy of sensation, in which he maintains that thinking is a secondary function and that the primary source of all knowledge lies in the sensations, of which the understanding is a product. Mind is therefore naturally and gradually developed out of the feelings, and it is the purpose of this concluding chapter to trace this process of evolution in connexion with the growth and co-ordination of the organs of touch, taste, smell, hearing, and seeing in the child from the moment of its birth as observed and described by Meynert, Preyer, and Genzmer. "Thought," says Feuerbach," is nothing but a past sensation, a sensation that no longer exists, an indirect, nullified, negatived sensation. A thing does not become an object of thought until it has vanished from view and from sensation. The question What is lightning? does not arise until the lightning is past." In general, thinking is feeling extended to remote or absent objects; it is feeling what is no longer really felt, or seeing what is no longer actually seen. We see the external movement of the mass with the bodily eye; we see with the mind's eye or think the inner movement of the molecules of which the mass is composed; but it is through the visible massive movement that the invisible molecular movement is revealed to us.

It is impossible in this brief notice to enter into a critical discussion of the questions here involved. Whether our readers may accept or repudiate Rau's conclusions, they can hardly fail to be interested in his thoroughly independent and masterly exposition of the relations between feeling and thinking in the light of recent physiological and biological researches and under the all-pervading influence of the doctrine of evolution. E. P. E.

CONTRIBUTIONS TO THE ANALYSIS OF THE SENSATIONS. By *Dr. Ernst Mach*, formerly Professor of Physics in the University of Prague, now Professor of the History and Theory of Inductive Science in the University of Vienna.

Translated by *C. M. Williams*. With Thirty-seven Cuts. Chicago: The Open Court Publishing Co. 1897. Pages, 208. Price, $1.25 net.

The present work has in this translation experienced considerable augmentation at the hands of the author. Numerous notes have been added completing the discussions and bringing them down to date, while two appendices containing much supplementary and explanatory matter have been incorporated in the book. The first appendix on "Facts and Mental Symbols" is of extreme importance to students of the history and theory of science, as an effort to do away altogether with the dualism of feeling and motion, of an inward subjective world and an outward objective reality. It is a species of autobiographical apologia for the splendid "Introductory Remarks" to the book, which aim at banishing the metaphysical from scientific reasoning, and it hence throws much light on the growth of scientific hypotheses. In both these chapters Professor Mach seeks a monistic theory of the world which is faultlessly and genuinely monistic. That view of monism which sees in mind and matter two *aspects* of existence he regards as disguised dualism. To him the contrast between the psychical and the physical is not a duality but an identity. It is simply a connexion in a different way of the same fundamental elements of the world. An independent, underlying metaphysical nucleus of reality, which by its actions produces sensations, Professor Mach does not admit. All such hypotheses he regards as figments of the unconsciously acting, natural intellect in its effort at explaining things which need no explanation. To him the elements of the world are given in sensations. The different connexions of these elements alone determine the psychical or the physical character of the relations of the world. The world is, so to speak, a viscous *continuum* of elements, showing more coherency and density at certain spots, in which spots the elements are, metaphorically speaking, centred and focussed. These spots are the egos. There is no gulf between the ego and the world. "A variously interconnected content of consciousness is in no respect more difficult to understand than a rich and diversified interconnexion of the world." For the real world and the perceived world are one,—different settings only of the kaleidoscopic[1] play of the elements. This view has been characterised as idealism, as sensationalism, and as phenomenalism, and in an historical sense the designation is correct. But it is a dangerous and prejudicial practice to apply to *any* new and carefully worked-out theory a name having fixed and condemnatory historical connotations. No such characterisations, therefore, are to the point. Professor Mach insists that his view is *realism* in the true sense of that word, and that, despite the appearance of such to the inattentive reader, it is *not* Berkeleianism. Both the Introductory Remarks and the first Appendix are a specimen of *descriptive* philosophical analysis which both philosophical and scientific students will do well to study.

As to the matter proper of the book it has arisen from the conviction of the

[1] Not the author's word, of course

author that "the foundations of science as a whole and of physics in particular, await their next greatest elucidations from the side of biology, and especially from the analysis of the sensations." The chapters of the book are a connected recapitulation of all that the author has done in psychology which, despite its small volume, is in both contents and method of rare value. As the translator well says: "The matter contained in a book is by no means proportioned to its size. If this were so, the present treatise . . . must be a bulky one."

The principle which is at the basis of the research of the present work is that there are as many physico-chemical neural processes as there are distinguishable qualities of sensation. This is the principle of the complete parallelism of the psychical and physical. Such was Helmholtz's explanation of tone-sensation, etc. To the exposition of this fruitful fundamental principle Professor Mach has devoted a separate chapter. The following chapters are devoted to space and sight sensations, the discussion of the æsthetic sensations of symmetry, sensations of motion, perspective, spatial solidity, etc. The discussions here are extremely original and pregnant with valuable suggestions. Convincing views are advanced in the chapter on "Time-Sensation," while in the section on "Sensations of Tone" we have the suggestion of a new hypothesis which would reduce the many specific energies assumed by Helmholtz to two only. The criticism of the theories of sound-sensation have already contributed, and will in the future contribute, greatly to the elucidation of the relations obtaining in the province of tone. Not the least important chapter in the book is the last on "Physics," where the author shows the influence of his psychological investigations on the altered mode of conception of physics. This chapter is a distinct contribution to the theory of science. Although published eleven years ago, Professor Mach's book is one which by its solidity and the permanent value of its results will never grow old.

We have also to mention briefly the appearance of the second edition of the same author's *Popular Scientific Lectures*. Four new articles have been added to this volume, viz., "The Part Played by Accident in Invention and Discovery," the recent lecture on "Sensations of Orientation," and two brief essays on the history of "Acoustics" and of "Spatial Vision." The same edition will also shortly be increased by an entirely new article on "The Photography of Projectiles," making the augmentation of new matter considerably more than one hundred pages. (Price, $1.00. Fifty Cuts. 382 pages.) *p.*

VERSUCH EINER PHILOSOPHISCHEN SELEKTIONSTHEORIE. Von *Dr. phil. Johannes Unbehaun*. Jena: Gustav Fischer. Pages, 150. Price, 3 Marks.

Dr. Unbehaun has undertaken the task of critically examining the philosophical foundations of the theory of selection viewed as a general method of nature and thought. Darwin's principle has crept into all domains of knowledge and conduct, and so has become invested with an importance extending far beyond the special realm of biology. Dr. Unbehaun, accordingly, strips the theory of selec-

tion of all the overgrowths and accretions which have been gathered about it by its being applied in special fields under special circumstances, and seeks to set forth the theory in its purest and most general abstract form. Every form of it, therefore, must be traced back to a common root, to some ultimate principle, appearing in the end as a piece of purely formal, logical philosophy. To give to his expressions greater exactness, he has employed mathematical theorems throughout, the subject being one which from its quasi-statistical character readily lends itself to such treatment. As to the contents of the little book, we have a brief and general retrospect of the ancient theories of selection, a brief review of its history through Malthus, Darwin, Wallace, Roux, and in some of its more allegorical extensions to the domain of chemistry, astronomy, geology, etc. In the second chapter the author proceeds to the enunciation of a purely deductive theory of selection where he applies mathematical analysis. As the result of all this philosophical and mathematical analysis we have the following, rather empty outcome, which scarcely seems to contain more than is contained in the current definitions of the theory; to-wit:

"By the side of existing adapted forms, that is, forms capable of existence, "there always arise or arose many non-adapted forms, by the side of the prizes in "the lottery of life, many blanks. Only on the submersion of the forms incapable "of existence is the existing degree of average adaptability reached. The principle "of 'progressive' selection presupposes that the newly originating forms should "show as regards already existing forms both conservative and variational tenden-"cies—in which case we have unrestricted progress."

The discussion itself, of course, being conducted with reference to definite facts, is more rich in associations and suggestions than this bald formula. The upshot of the whole book is that evolution is reducible to three principles: (1) a conservative principle; (2) a variational principle; and (3) a principle which makes against retrogression, which principle is essentially selection. Selection with conservation and variation are the condition of unlimited progress. The author finds here the foundations of an evolutionist philosophy which he proposes to develop in a later work. *μ.*

VORLESUNGEN ÜBER DIE MENSCHEN- UND THIERSEELE. Von *Wilhelm Wundt.* Dritte, umgearbeitete Auflage. Hamburg und Leipzig: Leopold Voss. 1897. Pages, 519.

The great value and popularity of Professor Wundt's lectures on Human and Animal Psychology is evidenced by the exhaustion of the second new German edition within the relatively short space of five years. Our readers will remember that the present work of Professor Wundt is a complete re-elaboration of one of his earliest youthful publications (1863) and that although bearing the same title it is practically a new work. The second German edition of the work has been translated into English by Mr. Creighton and Mr. Titchener of Cornell University, and

is published by The Macmillan Company. The third German edition is essentially the same as the second with respect to arrangement, but it has been carefully revised and in many places extended and improved, particularly in the chapters on Feelings, Emotions, Will, and Time. For details regarding the method, contents, and purpose of the work we refer our readers to the excellent review of the second edition by Professor Shorey in Vol. III., No. 2, of *The Monist*. All students of psychology should have and read Wundt's Lectures, for as the production of the most eminent living psychologist they are one of the best general introductions to psychology that exist. It is greatly to be regretted that the publishers have not supplied an index to the new edition, but it seems that nothing short of an Imperial edict will induce German publishers to make a systematic practice of this. If it could be done, humanity would be far more benefited than by any scheme of Chinese conquest or foreign colonisation. *μ.*

PSYCHOLOGIE ALS ERFAHRUNGSWISSENSCHAFT. Von *Hans Cornelius*. Leipzig: B. G. Teubner. 1897. Pages, 445. Price, 10 Marks.

Dr. Cornelius has written a very promising work, to judge from the remarks on "Method" which he has prefixed to his expositions. His book does not profess to be a complete enumeration and presentation of the facts of psychology and of the theories which have been advanced in explanation thereof, but its object is rather that of establishing a sound epistemological foundation for the science, or of giving a purely empirical theory of psychical facts to the entire exclusion of metaphysical hypotheses. At the basis of his considerations he has laid the methodological principles of Kirchhoff and Mach by which these inquirers replace the metaphysical ideas of physics by empirical conceptions merely epitomising the facts. According to this view, and according to the conception that explanation is only simplified and compendious description of facts, the author defines the object of psychology to be the completest and simplest possible compendious description of the *psychical* facts. This science should not begin with abstractions or hypotheses but only with direct and actually *lived* psychical experiences. No notion is admissible of which the fundamental psychical facts cannot be pointed to in experience. He compares his method to that which Hume pursued in his chief work, and with James's classical analysis of the stream of consciousness. In so far as his expositions are a theory of knowledge, they are largely in harmony with the inquiries of Avenarius and Mach. Kantian points of view are also present. At variance with the axioms of the author's thought are also the atomistic, the associational, and cerebral psychologies.

The work is divided into seven chapters, with an Introduction. In the Introduction the facts of the psychical life, as Dr. Cornelius conceives them, are stated as those of any other science would be, alone and for themselves and without reference to material processes. The first chapter then considers the elementary facts of the stream of consciousness, inventories the contents of consciousness, discusses

memory, recognition, abstraction, symbols, etc. The second chapter treats of the coherency of experience, laying greatest stress upon the principle of the economy of thought. We have here a treatment of subject and object, etc. In the third chapter psychical analysis and the notion of unperceived contents of consciousness are developed. Succession, time, attention, perception, and the concept of number, etc., here receive consideration. The fourth chapter discusses sensation, memory, and imagination; the fifth, the objective world, including the problem of the thing-in-itself, objective space, the facts of geometry, vision, etc. The sixth chapter is more logical in content, and deals with truth and error. In the seventh chapter we have feeling and will discussed.

The language and purpose of Dr. Cornelius are clear. The points on which he insists are points deserving emphasis. As to method his attempt is significant. If a science of psychology in the sense of the other sciences is ever built up, it must be upon some such foundations, and whether one agrees with Dr. Cornelius's detailed accomplishment of his task or not, one must nevertheless accord to him the credit of having approached his subject from a novel and fruitful point of view. From merely *envisaging* the subject in this manner, one can derive great profit

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THE LIVING SUBSTANCE AS SUCH AND AS ORGANISM. By *Gwendolen Foulke Andrews*. Supplement to Vol. XII. of *Journal of Morphology*. Boston: Ginn and Co.

The chemist refers the qualities of all substances to the different combinations of different atoms. The physicist starts with the molecule. What is the vital unit, to whose changes and combinations the biologist can refer differences between different tissues and organisms?

The oldest theories concerning life would seem to regard it as an energy radiating from some controlling centre in the blood or nervous system and thus vivifying a comparatively inert mass. Only comparatively lately has its inherence in every part of the organism been universally accepted. Only when this view of life as pervading or characterising every part of the organism, has been established, could there be any serious search for life-units.

This inquiry has been practically the work of the present century, although about a hundred years ago Bichat showed that the body was composed of a comparatively small number of textures or tissues which recurred in the most different organs. The theory of the cell as the fundamental constituent and true morphological unit of the body is but little more than fifty years old. These little masses of protoplasm, each having its own more resistent centre, the nucleus, and surrounded by its membrane certainly seemed to be the true and fundamental vital units. The apparently homogeneous protoplasm possessed all the vital powers and could perform all functions, the nucleus was regarded as hardly more than a little less fluid condensation of the protoplasm, the cell-membrane gave the mass indi-

viduality. Egg and spermatozoon were found to be single cells, the earliest embryonic stages are evidently little clusters of similar cells, every cell arises from a pre-existing cell, and every tissue arises from, and is composed of, cells. What better or more fundamental unit could be asked?

So Virchow speaking on this subject in 1858 could say: "Every animal presents itself as a sum of vital unities, every one of which manifests all the characteristics of life. . . . A so-called individual always represents a kind of social arrangement of parts, in which a number of individual existences are mutually dependent, etc." And Haeckel restates, only more emphatically, the same thought when he calls the animal a "cell-republic."

That the cell is a morphological unit possessing a certain degree of individuality cannot well be denied. Every living body is certainly composed wholly of cells and their products. But in spite of all this we may not be looking at the animal from the best standpoint when we call it a cell-republic.

For the extreme exponents of the cell theory in emphasising the individuality of the cell seem often to lose sight of the individuality of the organism. Against this one-sided view strong protests have already been made.

Thus many years ago Huxley wrote: "They (the cells) are no more the pro-"ducers of the vital phenomena than the shells scattered along the sea-beach are "the instruments by which the gravitative force of the moon acts upon the ocean. "Like these, the cells mark only where the vital tides have been, and how they "have acted."

Mrs. Andrews's monograph is a valuable contribution to biological science bearing directly upon this view. It is the result of years of patient and laborious observation. She has studied the living substance in its living condition. And the difficulties and discouragements of such study can be appreciated only by those who have attempted the same thing and have given it up in despair. The author supports in the main Bütschli's view that protoplasm is a microscopic foam, composed of exceedingly minute vesicles containing various solutions surrounded by films of a more viscous material. But even these viscous films are composed of a finer foam or emulsion. The fluid drops are separated from one another by the films, while these latter unite to form a continuous structure like a honey-comb. The continuous substance is the essential living material.

The continuous substance is continually changing in viscosity, arrangement, and function. The pseudopodia, or long slender processes of an amœba, may "extend like stiff bristles, or bend about like tactile organs, or lash the water like overgrown cilia or flagella. But a momentary touch upon the cover glass will in one moment convert all this display into inactivity, leaving but a shapeless lump. (P. 29.)

About twenty-five pages are devoted to "Areal Differentiation," i. e., the appearance of protective, contractile, transmissive, and other areas within the living substance of the simplest animals, and in developing eggs. "In the so-called 'low' "and 'primitive' forms of life, the substance-organisation is seen to be very com-

"plex, if here as in the metazoa the sum of all areal differentiations be taken as the "unit of count; but it is less stable and more fleeting,—often, indeed, to the point "of evanescence. Grosser structures are openly transmuted, whereas in the adult "higher forms there is a more stable mask of structure behind which the substance "carries on its unstable processes." (P. 65.) And even in the most stable tissues of higher animals local transformations and transmutations of areal structure are continually taking place. These, however transient, are the substance organs in distinction from the so-called organs of the individual organism.

Having shown the structure and areal differentiation of the living substance the author proceeds to Protoplasmic Activities and Cell Division. Perhaps the most interesting pages in this section are those on the filose formations or "thread-spinnings" of protoplasm. These threads were protruded abundantly by protozoa from their exposed surfaces and are hardly to be explained, if at all, by the mere physical surface-tension of a foam-structure. They occur also in the earlier embryonic stages, spun from cell to cell. "Since in certain eggs in the 8-16-celled "stage, in which the cells had been induced by continued pressure to separate "quite widely from each other while continuing their filose activities, the order of "cleavage and arrangement of cells in the characteristic spiral was not changed, it "seemed clearly proven that by the filamentous connexions there was maintained "true correlation and interaction of cells, notwithstanding a separation of their "pellicular surfaces. The fact that such was the case was noticed and pointed out "by Dr. Whitman long before I discovered the actual means by which the seem-"ingly inhibitory conditions were transcended." (P. 77.)

In eggs in the 4-16-celled stages the cells were caused to separate by more rapid and sudden pressure. "If actually separated, but without rupturing the "membrane perceptibly, as was done a number of times by pressure of a mixed "rolling and squeezing nature, the cells passed soon after through a great change "of viscosity, visibly relaxing. They then showed rather marked change of con-"tour, and afterward renewed their spinnings until once more connexion was re-"established amongst themselves, when by degrees they drew more and more closely "together until they touched. The walls then coalesced and the two, four, six, "eight, twelve, or more, cells were again a solid mass. . . . There can hardly "be a doubt but that there is here shown a definite physiological resistance to cer-"tain adverse mechanical conditions in environment; that the living substance re-"sponds in character of its own powers to stimulus of a given sort; that this "response is to conditions which are probably new to the substance, and is, more-"over, contrary in its nature to that given by purely physical foams." (Pp. 83, 84.)

The sections on the "New Structural Formula for Protoplasm" and the "Living Substance as Such, and as Organism," are full of thought, suggestion, and interesting observations, but must be read in their entirety to be appreciated.

The True Biological Standpoint from which to consider the living organism is therefore, according to our author, not the cell, nor the tissue, nor the organ, but

the substance itself in which cell, tissue, and organ are but areas of differentiation. Even the individual organism itself is but a means to the development of the substance through which it may attain an ever higher condition. The strongest and fittest substance, and that most powerful to control its environment, survives. The survival of the fittest is the survival of the fittest substance.

In the section on the Selection of Environment by the Living Substance special emphasis is laid on the internal environment of the substance in the contents of the foam vesicles. "This is more or less completely within its control, yet in-"fluences it largely and even to some extent controls it, physically and chem-"ically." "External environment represents rather opportunities for the organ-"ised living substance. Internal environment represents at a given moment not "only opportunities but intrinsic necessities for the substance." "From this "standpoint the organism appears in the guise of a machine or device framed by "the substance as such to secure its own specific internal environment." "Sub-"stance habit . . . has always been along lines of increased control, direct or indi-"rect, of external environmental conditions." But scattered quotations, taken out of their connexion, can give but a poor idea of the thought and argument.

The standpoint of the author can perhaps be best seen from the following extract from the section on Heredity (p. 151):

"Up to this point it has been cumulatively shown that cell phenomena are "underlain by such phenomena of the continuous substance as would seem to in-"hibit us from using cells, even broadly, as primary units of physiological organi-"sation;—the new facts urging us to trace substance phenomena in a physical and "physiological continuity throughout all parts of organisms; to ignore cell-limits, "except as they fall within this interpretation; to see in cell-walls and in nuclei "local and even temporary substance-organs belonging primarily to the mass and "but secondarily to cells, their curious repetition being taken in relation to general "needs of the substance as such rather than as parts of cells as units of structure; "—in short to study cells as localities in a mass organisation of the continuous sub-"stance and as local expressions of substance habit in a significantly common "grouping. . . . Organs no longer appear as compounds of certain different sorts of "cells, but as a complex of minute substance-organs whose multiplication baffles "even the imagination, for they not only extend in a lessening series into the in-"visible subdivisions of the continuous substance but are constantly being trans-"muted into new strnctures."

We must leave important sections of the work entirely unnoticed. The great mass of observations and suggestions, many of them exceedingly interesting, cannot be touched in a review. The work is crowded with them. Indeed the line of argument often seems to be lost in the mass of facts adduced in its support or of inference from these. Sentences too are often obscure and require careful perusal before the exact meaning can be perceived. But the thought is there and will repay the effort of the reader.

To many, doubtless, the author will seem to have gone to an opposite extreme as far from the true mean as the position of the most bigoted cell theorist. But the evidence is continually increasing that the substance, rather than the cell furnishes us the true standpoint from which to study and explain the facts of anatomy and physiology. It is gradually becoming clear that cells are only subordinate, and by no means ultimate, fundamental, or comparatively independent, centres in one mass of substance, controlled by the organism as a whole. The theory of the organism which makes it a mere multitude of co-operating cells, like that theory of state-rights which makes of our nation a mere confederation of states, is liable to lead to very unsafe deductions. We must continue to speak of cells with their different powers and structures, but we must remember that cell-structure is only an areal differentiation in one mass of substance, and that its powers are delegated by the organism. One substance, characterised by sensibility, irritability, or by whatever name we may choose to call it, continuous through the organism, and passing in the reproductive elements from generation to generation through all the chain of life in time past and present, ever changing and yet persisting, resistent and yet indefinitely adaptable;—such a substance would seem to furnish the basis for all vital phenomena.

But what becomes of our search for the vital, morphological units? We can hardly think, much less argue, concerning protoplasm without postulating something of the kind. We talk learnedly of physiological units and pangens, of plastidule and biophore. But we know only substance. But is there one fundamental substance, protean in its functions? Certainly protoplasm seems to be a mixture of various chemical compounds. Still all these substances may be merely more definite areal differentiations of one primitive protoplasm. Even if we could arrive at one primitive, homogeneous, living substance, would the real difficulties in the way of an understanding of its functions and powers be lessened? We cannot see that they would. The correlation between structures and actions of different parts of a homogeneous substance would seem less rather than more conceivable. This is the great enigma of life; the "fitsomeness" of the substance, the conformity of it to its inclusions and the molding of them to it, the fitting of its parts to one another and of itself to its environment. And from the solution of this enigma we seem as far removed as ever.

JOHN M. TYLER.

THE CHANCES OF DEATH AND OTHER STUDIES IN EVOLUTION. By *Karl Pearson*, M. A., F. R. S. With Illustrations. In Two Volumes. London and New York: Edward Arnold, Publisher.

The title of this book renders the first essay more prominent than the rest of the articles, and is apt to give a wrong impression to the book-buyer who glances over the pages of a catalogue. The book consists of a collection of essays on most various topics—the Roulette of Monte Carlo; Reproductive Selection and Its Chances; Woman and Labor; Woman as a Witch; the Passion Play, a Study of

the Evolution of Western Christianity, etc., but all are treated from the same point of view which replaces the colored spectacles through which the Märchen looks at the world by the exact figures of a scientific conception of facts, and thus Karl Pearson sheds much light on our old traditions, inherited opinions, and institutions. In order to characterise the treatment which all these questions receive at the hand of our author, we sketch here his exposition of the *Märchen* as a witness of an old civilisation which preceded Christianity and may have prevailed in Germany in the age when Tacitus wrote or even previous to it. Professor Pearson says:

"Ashiepattle, the dirty ash-lad, Hans 'der Dummling,' a 'Schneiderlein,' or "the miller's boy, sets out into the world to seek his luck. He is courteous and "friendly to an old woman whom he meets in the forest, and who possesses mag-"ical powers. He travels through many kingdoms, and at last he comes to one "where the king is in difficulties from dragons or giants, or in domestic trouble "owing to his daughter declining matrimony until a wooer is found who can per-"form certain notable feats. Hans, with the aid of the aforesaid old woman, either "achieves prodigious victories, or accomplishes all the tasks proposed to him. He "then demands his bride; he marries the princess and becomes heir to the "throne."

In the Märchenland "kings were as plenty as blackberries," and "the great "bulk of the population we have to deal with leads a country life. We may be "taken into a village, but rarely, if ever, into a town. We have to deal with "peasants and with hunters, with men and women of the fields and of the forests. "We are introduced to goose-girls, to swineherds, to women who spend their time "amid cows and goats, and men who chop wood and hunt. If the craftsman comes "in, it is the craftsman of the village community, the blacksmith, the tailor, or the "miller. If we go into towns and palaces, it is the simpleton and country lad who "takes us there; we do not deal with ships and merchandise, but with agricul-"tural produce and the trophies of the chase. Cathedrals and knights and men in "armor are not of our company. If we want advice or sympathy we seek it not of "priests or lawyers, of bailies or *Amtmänner;* we go to the animals, to a *weise* "*Frau* or a *Hexe*. With the exception of kings, to be referred to later, the "*Schultheiss*, or elected head of a peasant community, is almost the chief author-"ity we come across. In short, the people who developed the Teutonic *Märchen*, "as we know it in our Grimm, were not a town population, but one living by agri-"culture and hunting; not a people of the mountains, the snows, and the lakes, "but a people living rather in the clearings of the forest; a people with a primi-"tive agriculture, chiefly conducted by women; a people to whom the witch and "wise woman, rather than the priest and knight, were the guides and instructors "in life. The *Märchen* have been added to, developed, modified; all sorts of "later elements and personages have been grafted on to them, but, taken in the "bulk, we see quite clearly that they are *not the production of an age which* "*knew Christianity and chivalry*."

The civilisation of the *Märchen* is the period of matriarchy. The man marries into the wife's family; the mother goddess is still of great influence; the *Hexe* is by no means the ugly hag of the Middle Ages, but rather the wise woman, the queen. To conquer a kingdom in those days one had simply to kill the king and marry the queen, or if it was done in a more peaceful way, one married the daughter of a king. In the Norse tale *De syv Folerne* the king says to Ashlad, his son-in-law:

"You have got half the kingdom, and the other half you shall have on my "death; for my sons can win land and kingdoms for themselves, now they are "again princes."

Professor Pearson asks:

"And what became of *Märchenland?* It faded away before a world of gram- "mar, history, and geography, a hundred times more idle and unreal than itself."

Our author concludes his study with these words:

"As we read fairy stories to our children, we may study history ourselves. No "longer oppressed with the unreal and the *baroque*, we may see primitive human "customs, and the life of primitive man and woman, cropping out in almost every "sentence of the nursery tale. Written history tells us little of these things, they "must be learnt, so to speak, from the mouths of babes. But there they are in the "*Märchen* as invaluable fossils for those who will stoop to pick them up and study "them. Back in the far past we can build up the life of our ancestry—the little "kingdoms, the queen or her daughter as king-maker, the simple life of the royal "household, and the humble candidate for the kingship, the priestess with her "control of the weather, and her power over youth and maid. In the dimmest "distance we see traces of the earlier kindred group-marriage, and in the nearer "foreground the beginnings of that fight with patriarchal institutions which led the "priestess to be branded by the new Christian civilisation as the evil-working "witch of the Middle Ages. All this and something more may be learnt by the "elder, while little eyes sparkle and little cheeks grow warm over the success "which attends kindly, simple Ashiepattle in the search for his luck." K.

BUDDHISM AND ITS CHRISTIAN CRITICS. By *Dr. Paul Carus.* Chicago: The Open Court Publishing Co. 1897. Pages, 316. Price, $1.25.

The main difficulty, perhaps, about Buddhism is the apparent contradiction involved in its teaching that there is no soul and yet preaching morals, the purification of the soul, and its immortality. Almost all criticisms of Buddhism either denounce the system as inconsistent, or condemn it as atheism and nihilism. It is these problems which all who study Buddhism will encounter, and almost all who have failed to grasp its significance have stumbled here. The fact is that Buddhism is a religion which possesses a definite philosophy, and its main problem centres in psychology. All the other religions are different in this respect. They are exclusively practical, and committed to no special philosophy. Their founders used cer-

tain religious terms and left it to the development of the churches to work out a metaphysical foundation. Christian philosophies, such as those of Thomas Aquinas and Duns Scotus, propounded doctrines that were very antagonistic among themselves, and yet they might all be considered as good Christian philosophies. Mohammedan philosophers, especially in Spain, were allowed great liberty of thought, and doubtless, too, interpreted their religion in various ways. Buddhism is different in that it permits great freedom in the development of rituals and has actually produced the most complicated and fantastic ceremonies with strong local coloring both in the south and in the north, in Siam and in China, while its underlying philosophy remained the same. But being a philosophy which requires abstract thinking, we must not expect that every parish priest should be acquainted with it, let alone understand it, and the main difficulty to Buddhists themselves is this apparent contradiction, that in one respect they teach unequivocally the non-existence of the soul, and in other respects as unequivocally urge the necessity of salvation for the life to come.

The present book enters in a general way into this main difficulty and throws light upon more than one side. Buddhism rejects all those features of Brahmanism which by Brahmans were deemed to be the essential features of religion, viz., the divine inspiration of the Vedas, the helpfulness of prayer, and the meritoriousness of sacrifices. Buddha replaces the first by independent investigation. "Be ye lamps unto yourselves," he says to his disciples, even in his dying hour. The second, viz., "prayers," he replaces by "vows." For the third, Buddhism has substituted flower offerings at Buddha's shrines. But the emphasis of a religious life is placed on walking in the noble eightfold path of righteousness. The Samkhya philosophy from which Buddhism took its start is a dualism. It regards matter as the cause of all pain, and seeks salvation in the riddance of the soul from the body. Buddha retained many of the formulas of the Samkhya philosophy, but he denied the existence of the soul as an essence, and saw in it a mere compound of activities. But here lies the difficulty. These activities are not nonentities, but though they are not substances they are yet in their peculiar character the most important realities of life. There is nothing in the world that a man can call his own, neither fortune nor power, nor even personal relations, wife, and children, and friends, except his deeds. They are he himself. He inherits them by his ancestors, and he transmits them to the world when he departs. Thus, that which constitutes his being existed before him and will exist after him. He is the continuity of certain activities in a new combination, and these activities continue in new combinations after his death.

It is perhaps difficult to understand the reality of such an existence which is unsubstantial, but any one trained in abstract thinking will not fail to grasp its significance. Similar propositions occurred again and again in the world of science and were denounced for similar reasons as destructive and nihilistic. For instance, in physics the idea prevailed that fire was a certain substance which was called

fire-stuff or phlogiston. When some advanced physicists came to the conclusion that phlogiston did not exist, they were first ridiculed for daring to overthrow the orthodox conception of fire, and were suspected of maintaining that fire was a non-entity. The same process again occurred when in physiology the time-honored "vital force" was denied to have any substantial existence. The old vitalist school once occupied the field alone, but any one who would not believe in a vital force was regarded as ignorant and impervious to the most obvious truths of physiology. Vitalism as an independent force in animated substances was regarded so much as a matter of direct experience that it took almost half a century for the new physiology to overcome this time-honored superstition. At present the old vitalism is entirely overthrown, and the only defendant of it, Professor Bunge, practically defends only the advisability of retaining the name which he, however, interprets in a new sense which as much denies the old vitalism as do the other physiologies. In this same sense Buddhism denies the existence of a soul-stuff in any form, be it as a soul-monad or as a soul-force, or as a kind of vital breath. It denies what the Brahmans call âtman, but it does not deny the reality of man's deeds, the reality of the importance of morality, the reality of the present life of man and its future continuance in this same life in which we now live. At the same time Buddhism employs symbols which practically are the same as the Christian symbols in representing the future life as the reappearance in a paradise. Nirvâna must not be confounded with the Christian heaven, for Nirvâna is realisable in this life as well as in any other life. Nirvâna is the attainment of salvation, not the enjoyment of heavenly bliss, and therefore the representations of Nirvâna and of the Western Paradise are very different in Buddhism.

The present book consists of six chapters. The first is an exposition of Buddhism, its origin from Brahmanism, and its connexion with the Brahman philosophies, especially the Samkhya school. The second chapter enters into philosophical questions, explaining the anti-metaphysical bent of Buddha's theory, the doctrine of the deathless, and of salvation as the attaining to the deathless. The third chapter is devoted to Buddhist psychology and to its denial of the âtman-soul. The concepts Karma and Nirvâna receive special treatment in the fourth chapter. The fifth chapter compares Christianity and Buddhism, bringing out not only its contrasts but also its striking similarities, both in ethics and in innumerable details which have always suggested the idea of a common origin of the two religions. The last chapter is cast in the form of replies to those Christian critics of Buddhism who have misunderstood its doctrines, especially the doctrine of the soul and its nihilism. The author believes that comparison is indispensable for acquiring comprehension, and for this reason he would urge Christians to study Buddhism and Buddhists to study Christianity. He believes that Buddhists would be immeasurably benefited by studying Christianity as it really is, especially in Protestant countries, while the Christians have very great need of studying Buddhist philosophy, which

formulated for the first time in the history of religion the fundamental problem of the religious life. *p.*

MODERN MYTHOLOGY. By *Andrew Lang, M.A., LL.D.* St. Andrews, Honorary Fellow of Merton College, Oxford, Sometime Gifford Lecturer in the University of St. Andrews. New York, London, and Bombay: Longmans, Green & Co. 1897. Pages, 212.

The luminous and voluminous *Contributions* of Prof. F. Max Müller *to the Science of Mythology* which we noticed in Vol. VII., page 625 of *The Monist* have met their scientific retort courteous in the present little volume of Mr. Andrew Lang, the well-known English writer, inquirer and vulgariser of folklore, editor, littérateur, and high-priest of English literary criticism—Prof. Max Müller's favorite target in his strictures on the anthropological school of mythological inquiry.

To animadvert upon the method of exposition employed by these two controversialists is not our concern. We shall limit ourselves to saying that the method of exposition employed is not adapted to the needs of the general reader, but in both cases is that of isolated and disconnected discussions upon subjects with which the student must be antecedently familiar, which, though they offer no intrinsic difficulties to comprehension, yet require prior interest and some preparatory philological and ethnological knowledge. Furthermore, there is much in both volumes that is personal. Mr. Lang in taking up cudgels for the anthropological school has followed, he claims, Prof. Max Müller's system of attack, and hence his reply is, as he himself phrases it, highly "desultory and rambling." The contents of Mr. Lang's book are as follows: I. Recent Mythology; II. The Story of Daphne; III. The Question of Allies; IV. Mannhardt; V. Philology and Demeter Erinnys; VI. Totemism; VII. The Validity of Anthropological Evidence; VIII. The Philological Method in Anthropology; IX. Criticism of Fetishism; X. The Riddle Theory; XI. Artemis; XII. The Fire-Walk; XIII. The Origin of Death. Each of these chapters is broken up into subdivisions after the manner of his opponent's book, and headed by bold-faced type—happily designed for the guidance of the reader through a chaotic maze of disordered argumentations. This, in conjunction with the excellent index, offsets the many disadvantages of the book and enhances its value for occasional consultation; for it really abounds in bright, witty, and pertinent remarks, notable both for their common sense and scientific insight.

Be the result of the controversy what it may, and opinion in these days seems to lean towards the anthropological school, the sweet and assuring remark of Mr. Lang at the conclusion of his volume still remains irrevocably true.

"If I am right, if he [Prof. Max Müller] is wrong, in our attempts to untie "this old Gordian knot, he loses little indeed. That fame of his, the most steady "and brilliant light of all which crown the brows of contemporary scholars, is the "well-earned reward, not of mythological lore nor of cunning fence in controversy "but of wide learning and exquisitely luminous style."

Since Prof. Max Müller's theories of mythological interpretation are well known, we quote as an offset, the following clear statement by Mr. Lang of the anthropological method.

"Our system is but one aspect of the theory of evolution, or is but the appli-
"cation of that theory to the topic of mythology. The archæologist studies human
"life in its material remains; he tracks progress (and occasional degeneration)
"from the rudely chipped flints in the ancient gravel beds, to the polished stone
"weapon, and thence to the ages of bronze and iron. He is guided by material
"'survivals'—ancient arms, implements, and ornaments. The student of Institu-
"tions has a similar method. He finds his relics of the uncivilised past in agricul-
"tural usages, in archaic methods of allotment of land, in old marriage customs,
"things rudimentary—fossil relics, as it were, of an early social and political con-
"dition. The archæologist and the student of Institutions compare these relics,
"material or customary, with the weapons, pottery, implements, or again with the
"habitual law and usage of existing savage or barbaric races, and demonstrate that
"our weapons and tools, and our laws and manners, have been slowly evolved out
"of lower conditions, even out of savage conditions.

"The anthropological method in mythology is the same. In civilised religion
"and myth we find rudimentary survivals, fossils of rite and creed, ideas absolutely
"incongruous with the environing morality, philosophy, and science of Greece and
"India. Parallels to these things, so out of keeping with civilisation, we recognise
"in the creeds and rites of the lower races, even of cannibals; but *there* the creeds
"and rites are *not* incongruous with their environment of knowledge and culture.
"There they are as natural acd inevitable as the flint-headed spear or marriage by
"capture. We argue, therefore, that religions and mythical faiths and rituals
"which, among Greeks and Indians, are inexplicably incongruous have lived on
"from an age in which they were natural and inevitable, an age of savagery."

T. J. McC.

DIE MECHANIK IN IHRER ENTWICKELUNG. Historisch-kritisch dargestellt. Von Dr. Ernst Mach, Professor an der Universität zu Wien. Mit 250 Abbildungen. Dritte verbesserte und vermehrte Auflage. Leipsic: F. A. Brockhaus. 1897. Pages, 505.

It is a pleasure to record the appearance of the third edition of Professor Mach's *Mechanik*, which, more than any other book of recent years perhaps, has aroused the interest of thinking people in the foundations of mechanics and in the philosophy of science generally. The long succession of works which have followed its publication have borne witness to the fruitfulness and the necessity of researches in the theory and history of science as bearing upon the fundamental questions of philosophy, and there is no indication of this activity being on the decrease. We have recently received from Dr. Giovanni Vailati a pamphlet *On the Importance of Researches in the History of Science* (Turin, Roux Frassati e Co.),

forming the introduction to a course of lectures on the history of mechanics at the University of Turin, which portrays in detail the rise of these inquiries and correctly emphasises their importance. It is interesting to note the large number of courses which are now given in the universities of Europe on scientific history; and the reaction of these studies upon our views as to the nature of science and upon the less rigid presentment of its ideas, cannot but be a speedy and beneficent one.

The present edition of Mach's *Mechanik* has been carefully revised throughout, many errors have been eliminated, the matter which appeared in the second edition as appendices has been incorporated in the text, while several new additions, discussing recent views, such as those of Hertz, have been made. The book has been increased in this way by a total of thirteen pages. As its points of view are already familiar to our readers, we leave it with the hope that its good and enlightening influence may continue to reach wider and wider circles.

I DISEREDATI E I LORO DIRITTI. By *Pietro Pellegrini*. Borgo A Mossano: Tipografia Editrice, N. Vannini. 1897. Pages, 205. Price, 3 Lire.

This book on *The Disinherited and their Rights* is another contribution to the ever-present social question. The aim of the author is to set in proper relief the importance of the material element in social evolution, an element which he thinks has been unduly exaggerated. Evidently in Italy the influence of the materialistic conception of history is far greater than it is in America. The author modestly disclaims any attempt to put his treatise in a scientific form. He intends to show, he says, how the necessary and evident evolution of capitalism is about to take a juster form by creating a new juridical and social order upon the physical order now existing. Among the subjects treated in the various chapters are the development of society from the bourgeois to the proletariate, the physical industrial organism, the personality of industrial organs, and several strictly economic subjects, such as wages and interest, the limits of capital, the evolution of capital, etc. The concluding chapters are on socialism, the new era, and peace. I. W. H.

KANT-STUDIEN. Von *Dr. Erich Adickes*. Kiel and Leipsic: Verlag von Lipsius & Tischer. 1895. Price, 4 marks.

Adickes's *Kant-Studien* contains two treatises. The first treatise elucidates the development of Kant's epistemological views from the traditional philosophy of his time, which was Leibnitz's rationalism systematised by Wolf and modified by the empirical considerations of Crusius. The most important treatise that bears on this question is Kant's *Nova Diluvidatio* of 1755, his habilitation speech, which upon the whole still represents the old standpoint. A marked progress appears in Kant's writings of the years 1762-63, and his book "The Dreams of a Visionary" (*Träume eines Geistersehers*), show a radical change of front. He is now an empiricist in his writings until he became, through Hume, confronted with the problem of necessity and universality. This took place, according to Beno Erdmann

and Vaihinger, in 1772 or later, according to Adickes in 1769. The difficulties in which Hume's problem involves Kant and the various attempts to escape Hume's scepticism, until Kant found a satisfactory solution in his transcendentalism, are discussed in the fourth chapter, which is the most important part of the essay.

The second treatise of the *Kant-Studien* is an attempt at refuting Arnold's proposition that Kant wrote *The Critique of Pure Reason* in the year 1779. Adickes declares that Arnold's evidences are pure fiction, and undertakes to prove that the concise outline of the *critique* (*Kurzer Abriss*), which of course preceded the final execution of the book, was written in 1780.

DER ENTWICKLUNGSGANG DER KANTISCHEN ETHIK BIS ZUR KRITIK DER REINEN VERNUNFT. Von *Friedrich Wilhelm Foerster, Dr. phil.* Berlin: Mayer & Müller. 1894. Price, 2 marks.

The revival of Kant's philosophy is one of the most remarkable features of the present condition of German philosophy, of which the above pamphlet as well as Vaihinger's periodical publications are important symptoms.

The doctor's dissertation of Friedrich Wilhelm Foerster is an important and interesting contribution to the history of Kant's development from Eudæmonism to the idea of the autonomy of pure reason. Dr. Foerster bases his investigation upon a fragment of Kant's MS., published in the *Altpreussische Monatsschrift*, Vol. XXIV., 3–4. Emil Arnold, on purely philological grounds, assigns the year 1789 as the date of this fragment. But considering the evidence which Dr. Foerster produces on purely internal grounds, it is probable that it characterises the period of transition, and is for that reason one of the missing links which prove that Kant's ideas of practical reason were not a mere product of his purely theoretical considerations, but are an expression of his practical experiences in life. The article is well written, and justifies us in expecting further good works from the same author. His dissertation, however, would be easier to read if it had been divided into subdivisions of some kind with separate headings. As it stands, without a table of contents and without an index, it requires much patience on the part of the reader to work his way through the author's expositions.

A STUDY OF KANT'S PSYCHOLOGY WITH REFERENCE TO THE CRITICAL PHILOSOPHY. By *Edward Franklin Buchner, Ph. D.* Lancaster, Pa.: The New Era Print. 1897. Price, $1.25.

This is one of the able essays that have been appearing in the Monograph Series supplementary to the *Psychological Review*, and will be found to be a thorough examination of Kant's psychological doctrines.

As a supplement to the *Psychological Review* appears also (April, 1897) No. 3 of *The Psychological Index* which is a bibliography of all the literature of psychology and cognate subjects for 1896, compiled by Mr. H. C. Warren, of Princeton, and Mr. L. Farrand, of Columbia. It is invaluable to all workers in this field.

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EVOLUTION AND ETHICS.[1]

TO A STRICTLY logical mind the method of the development of thought must be a perplexing, even irritating matter. Its course is not so much like the simple curve described by a bullet as it speeds its way to a mark, as it is like the devious tacking of a sail boat upon a heavy sea with changeable winds. It would be difficult to find a single problem during the whole record of reflective thought which has been pursued consistently until some definite result was reached. It generally happens that just as the problem becomes defined, and the order of battle is drawn, with contestants determined on each side, the whole scene changes; interest is transferred to another phase of the question, and the old problem is left apparently suspended in mid air. It is left, not because any satisfactory solution has been reached; but interest is exhausted. Another question which seems more important has claimed attention. If one, after a generation or a century, reviews the controversy and finds that some consensus of judgment has finally been reached, he discovers that this has come about, not so much through exhaustive logical discussion, as through a change

[1] This paper was delivered as a public lecture during the Summer Quarter's work of the University of Chicago. This will account for the lack of reference to other articles bearing on the subject. I would call special attention, however, to Mr. Leslie Stephen on "Natural Selection and Ethics," in the *Contemporary Review*, and the article by Dr. Carus in *The Monist*, Vol. IV., No. 3, on "Ethics and the Cosmic Order."

in men's points of view. The solution is psychologically, rather than logically, justified.

This general reflexion is called to mind as I undertake the discussion of the question of the relation of evolution and ethics. A generation ago the entire interest was in the exact relation between man and the lower animals. We had one school concerned with reducing this difference to the lowest possible limits and urging that the consciousness of man, intellectual and moral, as well as his physical nature, might be considered a direct inheritance through easy gradations from some form of the anthropoid ape. We had another school equally concerned with magnifying the difference, making it, if possible, an unbridgeable chasm. It would be a bold man who would say that this controversy has been settled by the actual weight of concrete detailed evidence, or even that it has been very far advanced. The writings which really throw light on the question, in either direction (so far as the facts are concerned and not merely general considerations), can probably be easily numbered on the fingers of the two hands. Yet suddenly we find that discussion of this question has practically ceased, and that what engages controversy is the relation of what I may call the evolutionary concepts in general to the ethical concepts. Points of agreement and disagreement between the ideas involved in the notion of evolution and those involved in the notion of moral conduct are searched for. It is the state of the imagination and the direction of interest which have changed.

It is the latter question which I purpose to discuss to-day. This particular phase of the problem was precipitated, if not initiated, by the late Professor Huxley in his Romanes lecture for 1893 on "Evolution and Ethics." It is some points in that address which I shall take as my text,—not for the sake of directly controverting them, but as convenient points of departure for raising the questions which seem to me fundamental. In that lecture, as you will all remember, Mr. Huxley points out in his incisive and sweeping language certain differences between what he terms the cosmic and the ethical processes. Those who recall the discussion following the lecture will remember that many felt as if they had received

a blow knocking the breath out of their bodies. To some it appeared that Mr. Huxley had executed a sudden *volte-face* and had given up his belief in the unity of the evolutionary process, accepting the very dualistic idea of the separation between the animal and the human, against which he had previously directed so many hard blows. To some conservative thinkers it appeared that Saul had finally shown himself among the prophets. The lecture was deplored or welcomed according to the way one interpreted it with reference to his own prepossessions.

The position taken by Huxley, so far as it concerns us here, may be summed up as follows: The *rule* of the cosmic process is struggle and strife. The rule of the ethical process is sympathy and co-operation. The *end* of the cosmic process is the survival of the fittest; that of the ethical, the fitting of as many as possible to survive. Before the ethical tribunal the cosmic process stands condemned. The two processes are not only incompatible but even opposed to each other. "Social progress means the checking of the cosmic process at every step and the substitution for it of another, which may be called the ethical process; the end of which is not the survival of those who happen to be the fittest in respect of the whole of the conditions which exist, but of those who are ethically the best. The practice of that which is ethically best—which we call goodness or virtue—involves a course of conduct which in all respects is opposed to that which leads to success in the cosmic struggle for existence. . . . The cosmic process has no sort of relation to moral ends. The imitation by man is inconsistent with the first principles of ethics. Let us understand once for all that the ethical progress of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it." (*Ethics and Evolution*, pp. 81–83, *et passim.*)

Even in the lecture, however, Mr. Huxley used certain expressions which show that he did not hold to this opposition in a sense which meant the surrender of his previous evolutionary convictions. Thus he says that the ethical process, "strictly speaking, is part of the general cosmic process, just as the governor in a steam engine is part of the mechanism of the engine." (Note, p. 115.) In

a later essay (published as Prolegomena), aroused somewhat by the clamour which the lecture had called forth, he makes his position even clearer. Here he illustrates his meaning by referring to the two hands as used in stretching or pulling. Each is opposed to the other, and yet both are manifestations of the same original force (p. 13). It is not that the ethical process is opposed to the entire cosmic process, but that *part* of the cosmic process which is maintained in the conduct of men in society, is radically opposed both in its methods and its aims to that *part* of the cosmic process which is exhibited in the stages of evolution prior to the appearance of socialised man upon the scene.

He makes this point clearer by reference to the analogy of a garden. (Pp., 9–11.) Through the cosmic process, independent of man, certain plants have taken possession of a piece of soil because they are adapted to that particular environment. Man enters and roots out these plants as noxious weeds, or at least as useless for his purposes. He introduces other plants agreeable to his own wants and aims, and proceeds at once to modify the environment; if necessary, changing the soil by fertilisation, building walls, altering conditions of sunlight and moisture so as to maintain his garden as a work of art—an artifice. This artificial structure, the one mediated by man's aims and efforts, is so opposed to the natural state of things that if man lets up in the ardor, the continuity, of his labors, the natural forces and conditions reassert themselves, the wall crumbles, the soil deteriorates, and the garden is finally once more overgrown with weeds.

Mr. Huxley is a trenchant writer, and his illustrations hold the mind captive. But possibly further consideration of this very illustration will point to a different conclusion. Illustrations are two-edged swords. There is no doubt in my mind of the justness of the analogy. The ethical process, like the activity of the gardener, is one of constant struggle. We can never allow things simply to go on of themselves. If we do, the result is retrogression. Oversight, vigilance, constant interference with conditions as they are, are necessary to maintain the ethical order, as they are to keep up the garden. The problem, however, is to locate this opposition

and interference,—to interpret it, to say what it means in the light of our idea of the evolutionary process as a whole.

Thus considering the illustration, the thought suggests itself that we do not have here in reality a conflict of man as man with his entire natural environment. We have rather the modification by man of one part of the environment with reference to another part. Man does not set himself against the state of nature. He utilises one part of this state in order to control another part. It still holds that "nature is made better by no mean, but nature makes that mean." The plants which the gardener introduces, the vegetables and fruits he wishes to cultivate, may indeed be foreign to this particular environment; but they are not alien to man's environment as a whole. He introduces and maintains by art conditions of sunlight and moisture to which this particular plot of ground is unaccustomed; but these conditions fall within the wont and use of nature as a whole.

These may appear as too obvious considerations to be worth mentioning. Surely they could not have escaped Mr. Huxley for a moment. Yet it is possible that their bearing escaped him; for, if I mistake not, when we allow our mind to dwell upon such considerations as these, the entire import of the illustration changes. We are led to conceive, not of the conflict between the garden and the gardener; between the natural process and the process of art dependent upon human consciousness and effort. Our attention is directed to the possibility of interpreting a narrow and limited environment in the light of a wider and more complete one,—of reading the possibilities of a part through its place in the whole. Human intelligence and effort intervene, not as opposing forces but as making this connexion. When Huxley says that "the macrocosm is "pitted against the microcosm; that man is subduing nature to his "higher ends; that the history of civilisation details the steps by "which we have succeeded in building up an artificial world within "the cosmos; that there lies within man a fund of energy operat-"ing intelligently and so far akin to that which pervades the uni-"verse that it is competent to influence and modify the cosmic "process,"—he says to my mind that man is an organ of the cos-

mic process in effecting its *own* progress. This progress consists essentially in making over a part of the environment by relating it more intimately to the environment as a whole; not, once more, in man setting himself against that environment.

Huxley himself defines the issue in words already quoted in which he contrasts the survival of those who "may happen to be the fittest *in respect of the whole of the conditions which exist*, to the survival of those who are ethically the best." The clause italicised sums up the whole problem. It is granted without argument that the fittest with respect to a limited part of the environment are not identical with the ethically best. Can we make this concession, however, when we have in mind the whole of the existing conditions? Is not the extent to which Mr. Huxley pushes his dualistic opposition, are not many of the popular contrasts between the natural and the ethical, results of taking a limited view of the conditions with respect to which the term "fit" is used? In cosmic nature, as Mr. Huxley says, what is fittest depends upon the conditions. If our hemisphere were to cool again, the "survival of the fittest might leave us with nothing but lichens, diatomes, and such microscopic organisms as that which gives red snow its color." We cannot work this idea one way without being willing to work it in the other. The conditions with respect to which the term "fit" must *now* be used include the existing social structure with all the habits, demands, and ideals which are found in it. If so, we have reason to conclude that the "fittest with respect to the whole of the conditions" is the best; that, indeed, the only standard we have of the best is the discovery of that which maintains these conditions in their integrity. The unfit is practically the anti-social.

Loose popular argument—Mr. Huxley himself hardly falls into the pit—is accustomed to suppose that if the principle of the struggle for existence and survival of the fittest were rigorously carried out, it would result in the destruction of the weak, the sickly, the defective, and the insane. An examination of this popular assumption may serve to illuminate the point just made. We are all familiar with Fiske's generalisation that civilisation is a pro-

duct of the prolongation of the period of infancy; that the necessity of caring for offspring not able to take care of themselves, during a continually lengthening period, stimulated the affection and care, the moral germs of social life, and required the foresight and providence that were the germs of the industrial arts upon which society depends. Mr. Fiske's contention, whether true or false, is worth putting over against the popular assumption. How far are we to go in the destruction of the helpless and dependent in order that the "fit" may survive? Clearly in this case the infant was one who was "fit," not only in ethical terms but in terms of furthering the evolutionary process. Is there any reason to suppose that the dependent classes are not equally "fit" at present, when measured by the whole of the conditions as a standard?

We may imagine a leader in an early social group, when the question had arisen of putting to death the feeble, the sickly, and the aged, in order to give that group an advantage in the struggle for existence with other groups;—we may imagine him, I say, speaking as follows: "No. In order that we may secure this advantage, let us preserve these classes. It is true for the moment that they make an additional drain upon our resources, and an additional tax upon the energies which might otherwise be engaged in fighting our foes. But in looking after these helpless we shall develop habits of foresight and forethought, powers of looking before and after, tendencies to husband our means, which shall ultimately make us the most skilled in warfare. We shall foster habits of group loyalty, feelings of solidarity, which shall bind us together by such close ties that no social group which has not cultivated like feelings through caring for all its members, will be able to withstand us." In a word, such conduct would pay in the struggle for existence as well as be morally commendable.

If the group to which he spoke saw any way to tide over the immediate emergency, no one can gainsay the logic of this speech. Not only the prolongation of the period of dependence, but the multiplication of its forms, has meant historically increase of intelligent foresight and planning, and increase of the bonds of social

unity. Who shall say that such qualities are not positive instruments in the struggle for existence, and that those who stimulate and call out such powers are not among those "fit to survive"? If the deer had never developed his timidity and his skill in running away, the tiger and the wolf had never shown their full resources in the way of courage and power of attack. Again, prevention is better than cure, but it has been through trying to cure the sick that we have learned how to protect the well.

I have discussed this particular case in the hope of enlarging somewhat our conception of what is meant by the term "fit"; to suggest that we are in the habit of interpreting it with reference to an environment which long ago ceased to be. That which was fit among the animals is not fit among human beings, not merely because the animals were non-moral and man is moral; but because the conditions of life have changed, and because there is no way to define the term "fit" excepting through these conditions. The environment is now distinctly a social one, and the content of the term "fit" has to be made with reference to social adaptation. Moreover, the environment in which we now live is a changing and progressive one. Every one must have his fitness judged by the whole, including the anticipated change; not merely by reference to the conditions of to-day, because these may be gone to-morrow. If one is fitted simply to the present, he is not fitted to survive. He is sure to go under. A part of his fitness will consist in that very flexibility which enables him to adjust himself without too much loss to sudden and unexpected changes in his surroundings. We have then no reason here to oppose the ethical process to the natural process. The demand is for those who are fit for the conditions of existence in one case as well as in the other. It is the conditions which have changed.[1]

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[1] Precisely it may be said, and that is just the reason that Mr. Huxley insists upon the opposition of the natural and the ethical. I cannot avoid believing that this is what Mr. Huxley really had in mind at the bottom of his consciousness. But what he says is not that the form and content of fitness, of struggle for existence, and of selection, change with the change of conditions, but that these concepts lose all applicability. And this is just the point under discussion.

Let us turn our attention from the idea of "fitness" to that of the process or method—the "struggle for existence." Is it true that in the moral sphere the struggle must cease, or that we must turn ourselves resolutely upon it, branding it as immoral? Or, as in the case of the idea of fitness, is this struggle as necessary to the ethical as it is to the biological? In reality, the idea of struggle for existence is controlled by the environment in which that struggle is put forth. That which is struggle for life, and successful struggle, at one time, would be inert supineness or suicidal mania at another. This is as true of varying periods in animal development as it is of the human contrasted with the animal. The nature of the struggle for existence is constantly modifying itself, not because something else is substituted for it, much less opposed to it; but because as the conditions of life change, the modes of living must change also. That which would count in the Carboniferous period will not count in the Neozoic. Why should we expect that which counts among the carnivora to count with man,—a social animal? If we do not find the same qualities effective (and hence to be maintained) in both cases; or if we find that opposed qualities are called for, what right have we to assume that what was once effected by the struggle for existence has now to be accomplished by another and opposed force?

The term "struggle for existence" seems to be used in two quite different senses by Mr. Huxley. In one case it means practically simply self-assertion. I do not see that the *struggle* for existence is anything more than living existence itself. Life tends to maintain itself because it is life. The particular acts which are put forth are the outcome of the life that is there; they are its expression, its manifestation.

Self-assertion in this sense carries with it no immoral connotation, unless life by its very nature is immoral. But Huxley also uses "struggle for existence" with a distinctly selfish meaning. He speaks of the "ape and tiger promptings" as branded with the name of sins. (P. 52.) He identifies self-assertion with "the unscrupulous seizing upon all that can be grasped; the tenacious holding of all that can be kept." (P. 51.) It is "ruthless." It

"thrusts aside or treads down all competitors." It "involves the gladiatorial theory of existence." (P. 82.) Hence it is a "powerful and tenacious enemy to the ethical." (P. 85.)

Surely, all this is rhetoric rather than philosophy or science. We inherit our impulses and our tendencies from our ancestors. These impulses and tendencies need to be modified. They need to be curbed and restrained. So much goes without saying. The question is regarding the nature of the modification; the nature of the restraint, and its relation to the original impulses of self-assertion. Surely, we do not want to suppress our animal inheritance; nor do we wish to restrain it absolutely,—that is, for the mere sake of restraint. It is not an enemy to the moral life, simply because without it no life is possible. Whatever is necessary to life we may fairly assume to have some relevancy to moral living. More than this is true. That self-assertion which we may call life is not only negatively, but positively a factor in the ethical process. What are courage, persistence, patience, enterprise, initiation, but forms of the self-assertion of those impulses which make up the life process? So much, I suppose, all would grant; but are temperance, chastity, benevolence, self-sacrifice itself, any less forms of self-assertion? Is not more, rather than less strength, involved in their exercise? Does the man who definitely and resolutely sets about obtaining some needed reform and with reference to that need sacrifices all the common comforts and luxuries of life, even for the time being social approval and reputation, fail in the exercise of self-assertion?

The simple fact of the case is of course that these promptings, even the promptings of the "tiger and the ape," are, simply as promptings, neither moral nor immoral; no more sins than they are saintly attributes. They are the basis and material of all acts whatsoever, good and bad. They become good when trained in a certain way, just as they become bad when trained in another way. The man who regards his animal inheritance as evil in and of itself apart from its relation to aims proposed by his intelligence, has logically but one recourse,—to seek Nirvana.[1] With him the prin-

[1] It is passing strange that Mr. Huxley should not have seen that the logical conclusion from his premises of this extreme opposition are just those which he has

ciple of self-negation becomes absolute. But with all others, the men and women whom Mr. Huxley is presumably addressing, self-restraint is simply a factor within self-assertion. It relates to the particular ways in which self-assertion is made.

I may appear here to have ignored Huxley's distinction between the struggle for existence and the struggle for happiness (p. 40). The former it will be said, he uses in a definite technical sense as meaning simply the struggle for the perpetuation of life, apart from the kind of life led, and as exhibiting itself in direct conflict with others, leading to the elimination of some. That struggle for existence it may be surely said, is not to be continued within the ethical process. The struggle for existence relates, he says, simply to the "means of living." Besides that we have the struggle for happiness, having to do with the uses to which these means are put,—the values which are got out of them, the ends.

I reply in the first place, that Mr. Huxley contradicts himself on this point in such a way that one would be quite justified in ignoring the distinction; and in the second place, that I am not able to see the validity of the distinction.

As to Mr. Huxley's self-contradiction, he asserts in a number of places that the struggle for existence as such (as distinct from the struggle for happiness) has now come to an end. It held only in the lower social forms when living was so precarious that people actually killed each other, if not for food, at least to secure the scanty store of food available. If it holds now at all it is simply among the small criminal class in society (p. 41), Now Mr. Huxley not only takes this position, but from a certain point of view is bound to take it. If the struggle is still going on, selection is still occurring, and there is every reason to suppose that as heretofore, it is a distinct agent in social progress; and Mr. Huxley is bound to hold that natural selection no longer operates in social progress and that therefore we must have recourse to other means. But if the struggle for existence has thus ceased of itself within any given

himself set forth with such literary power earlier in his essay (pp. 63–68). That he did not shows, to my mind, how much he takes the opposition in a rhetorical, not a practical, sense.

human society, what sense is there in saying that it is now "a tenacious and powerful enemy with which ethical nature has to reckon"? If it has died out because of the change of conditions, why should the ethical process have to spend all its energy in combating it? "Let the dead bury their dead."[1]

In other words, Mr. Huxley himself is practically unable to limit the meaning of the phrase "struggle for existence" to this narrow import. He has himself to widen it so as to include not only the struggle for mere continuance of physical existence, but also whatever makes that life what it is. The distinction between the struggle for existence and the struggle for happiness breaks down. It breaks down, I take it, none the less in animal life itself than it does in social life. If the struggle for existence on the part of the wolf meant simply the struggle on his part to keep from dying, I do not doubt that the sheep would gladly have compromised at any time upon the basis of furnishing him with the necessary food—including even an occasional bowl of mutton broth. The fact is the wolf asserted himself as a wolf. It was not mere life he wished, but the life of the wolf. No agent can draw this distinction between desire for mere life and desire for happy life for himself; and no more can the spectator intelligently draw it for another.

What then is the conflict, the tension, which is a necessary factor in the moral life—for be it remembered there is no difference of opinion with Mr. Huxley upon this point? The sole question is whether the combat is between the ethical process as such, and the cosmic, natural, process as such. The outcome of our previous discussion is that it cannot be the latter because the natural process, the so-called inherited animal instincts and promptings, are not only the stimuli, but also the materials, of moral conduct. To weaken them absolutely, as distinct from giving them a definite turn or direction, is to lessen the efficiency of moral conduct. Where then does the struggle come in? Evidently in the particu-

[1] Here is his flat contradiction: "Men in society are undoubtedly subject to the cosmic process. . . . The struggle for existence tends to eliminate those less fitted to adapt themselves to the circumstances of their existence" (p. 81). Compare this with pp. 15, 36, 38, and the other passages referred to above.

lar turn or direction which is given to the powers of the animal nature making up the immediate content of self-assertion. But once more, what does this turn or direction mean? Simply, I take it, that an act which was once adapted to given conditions must now be adapted to other conditions. The effort, the struggle, is a name for the necessity of this re-adaptation.[1] The conditions which originally called the power forth, which led to its "selection," under which it got its origin, and formation, have ceased to exist, not indeed, wholly, but in such part that the power is now more or less irrelevant. Indeed, it is not now a "power" in the sense of being a function which can without transformation operate successfully with reference to the whole set of existing conditions. Mr. Huxley states the whole case when he says that "in extreme cases man does his best to put an end to the survival of the fittest of former days by the axe and rope." The phrase, "the fittest of *former* days" contains the matter in a nut-shell. Just because the acts of which the promptings and impulses are the survival, were the fittest for by-gone days they are not the fittest now. The struggle comes, not in suppressing them nor in substituting something else for them; but in reconstituting them, in adapting them, so that they will function with reference to the existing situation.

This, I take it, is the truth, and the whole truth, contained in Mr. Huxley's opposition of the moral and the natural order. The tension is between an organ adjusted to a past state and the functioning required by present conditions. And this tension demands reconstruction. This opposition of the structure of the past and the deeds of the present is precisely that suggested in the discussion of the illustrative garden. The past environment is related to the present as a part to a whole. When animal life began on land, water became only one factor in the conditions of life, and the animal attitude towards it was changed. It certainly could not now get along without a water-environment, much less could it turn against it; but its relations to moisture as a condition of life were

[1] I have developed this conception psychologically in the *Philosophical Review* for Jan. 1897, in an article upon the Psychology of Effort.

profoundly modified. An embryonic Huxley might then have argued that the future success of animal life depended upon combating the natural process which had previously maintained and furthered it. In reality the demand was, that which was only a part should be treated as such, and thus subordinated to the whole set of conditions.

Thus when Mr. Huxley says (p. 12) that "nature is always tending to reclaim that which her child, man, has borrowed from her and has arranged in combinations which are not those favored by the general cosmic process," this only means that the environment *minus* man is not the same environment as the one that includes man. In any other sense these "combinations" *are* favored by the general cosmic process,—in witness whereof man through whom that process works has set his sign and seal. That *if* you took man out of this process things would change, is much like saying that if they were different they would not be the same; or, that a part is not its own whole.

There are many signs that Mr. Huxley had Mr. Spencer in mind in many of his contentions; that what he is really aiming at is the supposition on the part of Mr. Spencer that the goal of evolution is a complete state of final adaptation in which all is peace and bliss and in which the pains of effort and of reconstruction are known no more. As against this insipid millennium, Mr. Huxley is certainly right in calling attention to the fact that the ethical process implies continual struggle, conquest, and the defeats that go with conquest. But when Mr. Huxley asserts that the struggle is between the natural process and the ethical, we must part company with him. He seems to assert that in some far century it may be possible for the ape and the tiger to be so thoroughly subjugated by man that the "inveterate enemy of the moral process" shall finally be put under foot. Then the struggle will occur against the environment because of a shortage of food. But we must insist that Mr. Huxley is here falling into the very charges which he has brought against Mr. Spencer's school. The very highest habits and ideals which are organising to-day with reference to existing conditions will be just as much, and just as little, an obstacle to

the moral conduct of man millions of years from now, as those of the ape and the tiger are to us. So far as they represent the survival of outworn conditions, they will demand re-constitution and re-adaptation, and that modification will be accompanied by pain. Growth always costs something. It costs the making over of the old in order to meet the demands of the new.

This struggle, then, is not more characteristic of the ethical process than it is of the biological. Long before man came upon the earth, long before any talk was heard of right and wrong, it happened that those who clung persistently to modes of action which were adapted to an environment that had passed away, were at a disadvantage in the struggle for existence, and tended to die out. The factors of the conflict upon which Mr. Huxley lays so much stress have been present ever since the beginning of life and will continue to be present as long as we live in a moving, and not a static world. What he insists upon is reconstruction and readaptation,—modification of the present with reference to the conditions of the future.

With the animal it was simply the happy guess,—the chance. In society there is anticipation; with man it is the intelligent and controlled foresight, the necessity of maintaining the institutions which have come down to us, while we make over these institutions so that they serve under changing conditions. To give up the institutions is chaos and anarchy; to maintain the institutions unchanged is death and fossilisation. The problem is the reconciliation of unbridled radicalism and inert conservatism, in a movement of reasonable reform. Psychologically the tension manifests itself as the conflict between habits and aims: a conflict necessary, so far as we can see, to the maintenance of conscious life. Without habits we can do nothing. Yet if habits become so fixed that they cannot be adapted to the ends suggested by new situations, they are barriers to conduct and enemies to life. It is conflict with the end or ideal which keeps the habit working, a flexible and efficient instrument of action. Without this conflict with habits, the end becomes vague, empty, and sentimental. Defining it so that the

habits may be utilised in realising it makes it of practical value. This definition would never occur were it not that habits resist it.

Just as habits and aims are co-operating factors in the maintenance of conscious experience, just as institutions and plans of reform are co-workers in our social life, just as the relative antagonism between the two is necessary to their valuable final co-adaptation; so impulse, call it animal if we will, and ideal, call it holy though we may, are mutually necessary in themselves and in their mutual opposition,—necessary for the ethical process. It is well for the ideal that it meet the opposition of the impulse, as it is for the animal prompting to be held to the function suggested by the ideal.

In locating and interpreting this tension, this opposition between the natural and the moral, I have done what I set out to do. There is one other point which it seems worth while to touch upon before leaving the matter. Three terms are always found together in all discussions of evolution,—natural selection, struggle for existence, and the fit. The latter two of these ideas we have discussed in their bearings upon moral life. It remains to say a word or two upon natural selection. Mr. Huxley's position on this point is not quite clear. As has been already suggested, it seems to be varying, if not actually self-contradictory. At times he seems to hold that since the struggle for existence has ceased in the social sphere, selection has ceased also to act, and therefore the work formerly done by it (if we may for the moment personify it as an agent) now has to be done in other ways. (See the passages referred to on p. 331). At other times he seems to hold that it is still going on but that its tendency upon the whole is bad, judged from the ethical standpoint, and therefore requires to be consciously counteracted.

Certainly the question of the scope of selection in the sphere of social life is confused. Does it still continue or does it not? If it does operate what are its modes of working? Many seem to suppose that we do not have it excepting where we intentionally isolate those whom we consider unfit, and prevent them from reproducing offspring; or that it is found only if we artificially regulate

marriage in such a way as to attempt to select social and animal types considered higher at the expense of the lower. Mr. Huxley naturally considers selection in this sense, not only practically impossible, but intrinsically undesirable. But is this the only or the chief meaning of natural selection? Does it follow that social selection, to use a term employed by late writers, is something radically different from natural selection?

The belief that natural selection has ceased to operate rests upon the assumption that there is only one form of such selection: that where improvement is indirectly effected by the failure of species of a certain type to continue to reproduce; carrying with it as its correlative that certain variations continue to multiply, and finally come to possess the land. This ordeal by death is an extremely important phase of natural selection, so called. That it has been the chief form in pre-human life will be here admitted without discussion; though doubtless those having competent knowledge of details have good reason for qualifying this admission. However, to identify this procedure absolutely with selection, seems to me to indicate a somewhat gross and narrow vision. Not only is one form of life as a whole selected at the expense of other forms, but one mode of action in the same individual is constantly selected at the expense of others. There is not only the trial by death, but there is the trial by the success or failure of special acts—the counterpart, I suppose, of physiological selection so called. We do not need to go here into the vexed question of the inheritance of acquired characters. We know that through what we call public opinion and education certain forms of action are constantly stimulated and encouraged, while other types are as constantly objected to, repressed, and punished. What difference in principle exists between this mediation of the acts of the individual by society and what is ordinarily called natural selection, I am unable to see. In each case there is the reaction of the conditions of life back into the agents in such a way as to modify the function of living. That in one case this modification takes place through changes in the structure of the organ, say the eye, requiring many generations to become active; while in the other case it operates within the

life of one and the same individual, and affects the uses to which the eye is put rather than (so far as we can tell) the structure of the eye itself, is not a reason for refusing to use the term "natural selection." Or if we have limited that term to a narrower technical meaning, it is certainly no reason for refusing to say that the same kind of forces are at work bringing about the same sort of results. If we personify Nature, we may say that the influences of education and social approval and disapproval in modifying the behavior of the agent, mark simply the discovery on the part of Nature of a shorter and more economical form of selection than she had previously known. The modification of structure is certainly not an end in itself. It is simply one device for changing function. If other means can be devised which do the work more efficiently, then so much the better. Certainly it marks a distinct gain to accomplish this modification in one and the same generation rather than to have to trust to the dying out of the series of forms through a sequence of generations. It is certainly implied in the idea of natural selection that the most effective modes of variation should themselves be finally selected.

But Mr. Huxley insists upon another distinction. Stated in terms of the garden illustration, it is that: "The tendency of the cosmic process is to bring about the adjustment of the forms of plant life to the current conditions; the tendency of the horticultural process is the adjustment of the needs of the forms of plant life which the gardener desires to raise." This is a very common antithesis. But is it as absolute and sweeping as we generally affect to believe? Every living form is dynamically, not simply statically, adapted to its environment. I mean by this it subjects conditions about it to its own needs. This is the very meaning of "adjustment"; it does not mean that the life-form passively accepts or submits to the conditions just as they are, but that it functionally subordinates these natural circumstances to its own food needs.

But this principle is of especial importance with reference to the forms in which are found the lines of progressive variation. It is, relatively speaking, true of the weeds and gorse of the patch of soil from which Mr. Huxley draws his illustration, that they are ad-

justed to current conditions. But that is simply because they mark the result, the relatively finished outcome of a given process of selection. They are arrested forms. Just because the patch has got into equilibrium with surrounding conditions progressive variation along that line has ceased. If this were all the life in existence, there would be no more evolution. Something, in other words, did *not* adapt itself to "current conditions," and so development continued.

It would be ungrateful in any discussion of this subject not to refer to Malthus's classic illustration of the feast spread by nature —not big enough for the invited guests. It is supposed, in its application to struggle for existence and selection, that this means that the life-forms present struggle just to get a share of the food that is already there. Such a struggle for a quota of food already in existence, might result, through selection, in perfecting a species already in existence, and thus in fixing it. It could not give rise to a new species. The selection which marks progress is that of a variation which *creates* a new food supply or amplifies an old one. The advantage which the variation gives, if it tends towards a new species, is an organ which opens up a wider food environment, detects new supplies within the old, or which makes it possible to utilise as food something hitherto indifferent or alien. The greater the number of varieties on a given piece of soil, the more individuals that can maintain a vigorous life. *The new species means a new environment to which it adjusts itself without interfering with others.* So far as the progressive varieties are concerned, it is not in the least true that they simply adapt themselves to current conditions; evolution is a continued development of new conditions which are better suited to the needs of organisms than the old. The unwritten chapter in natural selection is that of the evolution of environments.

Now, in man we have this power of variation and consequent discovery and constitution of new environments set free. All biological process has been effected through this, and so every tendency which forms this power is selected; in man it reaches its climax. So far as the individual is concerned, the environment

(the specific conditions which relate to his life) is highly variable at present. The growth of science, its application in invention to industrial life, the multiplication and acceleration of means of transportation and intercommunication, have created a peculiarly unstable environment. It shifts constantly within itself, or qualitatively, and as to its range, or quantitatively. Simply as an affair of nature, not of art (using these terms in Mr. Huxley's sense) it is a profitable, an advantageous thing that structural changes, if any occur, should not get too set. They would limit unduly the possibility of change in adaptation. In the present environment, flexibility of function, the enlargement of the range of uses to which one and the same organ, grossly considered, may be put, is a great, almost the supreme, condition of success. As such, any change in that direction is a favorable variation which must be selected. In a word, the difference between man and animal is not that selection has ceased, but that selection along the line of variations which enlarge and intensify the environment is active as never before.

We reach precisely the same conclusion with respect to "selection" that we have reached with reference to the cognate ideas —"fit" and "struggle for existence." It is found in the ethical process as it is in the cosmic, and it operates in the same way. So far as conditions have changed, so far as the environment is indefinitely more complex, wider, and more variable, so far of necessity and as a biological and cosmic matter, not merely an ethical one, the functions selected differ.

There are no doubt sufficiently profound distinctions between the ethical process and the cosmic process as it existed prior to man and to the formation of human society. So far as I know, however, all of these differences are summed up in the fact that the process and the forces bound up with the cosmic have come to consciousness in man. That which was instinct in the animal is conscious impulse in man. That which was "tendency to vary" in the animal is conscious foresight in man. That which was unconscious adaptation and survival in the animal, taking place by the "cut and try" method until it worked itself out, is with man conscious deliberation and experimentation. That this

transfer from unconsciousness to consciousness has immense importance, need hardly be argued. It is enough to say that it means the whole distinction of the moral from the unmoral. We have, however, no reason to suppose that the cosmic process has become arrested or that some new force has supervened to struggle against the cosmic. Some theologians and moralists, to be sure, welcomed Huxley's apparent return to the idea of a dualism between the cosmic and the ethical as likely to inure favorably to the spiritual life. But I question whether the spiritual life does not get its surest and most ample guarantees when it is learned that the laws and conditions of righteousness are implicated in the working processes of the universe; when it is found that man in his conscious struggles, in his doubts, temptations, and defeats, in his aspirations and successes, is moved on and buoyed up by the forces which have developed nature; and that in this moral struggle he acts not as a mere individual but as an organ in maintaining and carrying forward the universal process.

JOHN DEWEY.

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"LEBENSLUST."

JOY is the sunshine of the soul. And like all other sunshine it is both a chief cause of growth and a most powerful antiseptic, a staunch friend of life and a deadly enemy of fungi, miasms, and decay generally. And yet men have hidden themselves from it in caves and dark places of the earth as if it were a pestilence. Yes, and are still hiding. By one of those curious errors of indirection so common in human experience the mere fact of pleasure being so inherently and strikingly attractive made men hesitate to openly avow it as an aim or object. In the first place, it was altogether too childish to say that you did a thing simply because you liked to do it, or wanted something merely because it would give you pleasure. It might be perfectly true, but one must formally give some more "grown-up" reason than that. In the second place, the pursuit of joy carried to extremes becomes hurtful, *therefore*—with that charming logic which has been so brayed into our ears in these "prohibition" days,—joy is not to be pursued at all,—officially. Fortunately the actual practice of the race has been far different. Hence most creeds and systems of morality or other guides of conduct have felt called upon to solemnly warn humanity against pleasure of all kinds, sometimes even against woman as the chief means thereof, apparently in the philosophic hope that by vehemently insisting that the race shall go ten miles against its instincts, it may possibly be (actually) got to go the one mile which is really desired. But this line of action, though well-meant and perhaps fairly effective, has one serious defect. It places so large a part of the joy-seeking activities of mankind completely outside of the pale of its sanction, that these come to be regarded as sinful

in themselves, to be indulged in only with an air of sneaking apology and regarded as mere, at best evil but necessary concessions to the "animal part" of man's nature. Hence when a man "plunges into pleasure" he usually leaves his reason and his sense of moral discrimination behind him; there is no such thing as a righteous, moderate indulgence, it's all wrong, and the only question is, how much can he stand without injuring his constitution or his business reputation. Consequently nearly all of the avowed pleasure-seeking which one sees is either idle luxuriousness or harmful dissipation, and a certain sort of stigma comes to attach to any one who ventures to advocate enjoyment as a legitimate aim of human conduct. But even at the risk of being accused of favoring and perchance practising all sorts of improper things from selfish hedonism to "licentiousness," I must declare that the message of the Fifth Gospel is unmistakable upon this point.

It is not only perfectly legitimate but one of the most whole some and elevating aims which can be found. As an incentive to vigorous, healthy development, both moral and physical joy takes its place beside the other great motive impulses, Love, Courage, and Hunger. We have already seen what a valuable guide to conduct our natural instincts and the pleasure that attends their gratification are, not merely in the physical but also in the mental and moral realms. So that in the race generally and the child especially a very large part of our activities will be found to have joy as a motive. As a spring of human action the relation between it and pain or discomfort is most singular and often puzzling. Whether more actions are determined by the fear of pain or by the hope of joy would be a question worthy of the dialectic of the schoolmen. The question clears somewhat when we remember that pain and pleasure are simply opposite extremes of the same scale of sense-vibrations. Moreover, both being purely relative, the mere escape from or cessation of pain becomes a pleasure by contrast, and the deprivation of pleasure a pain. So that we may be striving to gain or retain pleasure and avoid pain in one and the same action and which most powerfully impels us would be a question for the gods to decide.

The relation between the two would perhaps be most nearly expressed figuratively by saying that pain is the stern monitor who drives us into the path of safety and well-being, while pleasure is the smiling guide who leads our steps along it. Gaunt Hunger may drive us to the board, but kindly appetite presides at it after it is spread. Pain may be the primary cause of the first performance of most of our vital functions, but their continuation and harmonious repetition is chiefly determined by pleasure. And yet the pleasure, appetite, is merely a mild and bearable degree of the pain, hunger,—which brings us to the conclusion that pleasure is the great complement and normal successor of pain, and that most actions determined originally by pain or the fear of it which do not become pleasurable by repetition are physically injurious and ethically immoral. So that joy becomes Nature's stamp of approval.

Duty, if determined by rational and wholesome ideals, ultimately becomes a pleasure, and healthful courses of action originally involving much effort from repulsion, whether didactic or industrial, become in the end pleasurable when formed into "good habits."

Most things which we like to do (all which we like by instinct) are beneficial to us, to a greater or less degree. From a biologic point of view could we imagine the existence of a species whose preferences and pleasurable instincts were on the side of harm? How long would such a species survive in the struggle for existence? Of course, this motive like any other must take its place in the parliament of impulses and submit to the vote of the majority. It has, however, full rights upon the floor, and the burden of proof is in every instance in its favor. The mere fact that we take pleasure in a thing or action is good presumptive evidence of its value. While pain, and a good deal of it, is absolutely necessary to vital progress, yet far the larger, and more frequent and constant part in this is played by joy. The value of pain emphatically lies in its avoidance and its developing effect upon the mechanisms to that end, and while up to a certain point beneficial, beyond that it becomes injurious and even disastrous. Long-continued submission to bodily pain from physical inability to escape or failure to relieve

undermines strength, destroys appetite and nutritive powers, deranges the nervous system, and retards recovery in a most serious manner. And so far from "purifying" and elevating the moral sense, it is much more apt to blunt or distort it, to ruin the temper and destroy self-control. The "great sufferer" makes a most pathetic and instructive appearance but like some other martyrs, in a majority of instances, does not improve upon closer acquaintance. She is apt to become selfish and exacting, and the chief credit that she is usually entitled to is that she is no worse under the circumstances.

So that we have every reason not merely for recognising pleasure as an aim but for trusting it as a guide, subject of course to revision by our other impulses and aims. Here as everywhere morality, sanity, consist in balance. The great advantage of this recognition is the powerful aid which it gives in making goodness positive and aggressive, instead of negative and defensive. Let it once be admitted that joy is righteous in itself and legitimate as an aim and a long step has been taken towards making righteousness joyful and duty a pleasure. The deplorable and disastrous attitude upon this point taken, for the most part by Christianity in general and by Puritanism in particular needs no extended notice here. It is sadly familiar to all of us both personally and historically and has been utterly condemned not merely by modern science, but by the common sense and healthy instincts of humanity in all the ages. It is not merely erroneous but profoundly immoral and with the very best of intentions has cast a deeper gloom over and brought well-nigh as much suffering upon the human race, as any of the vices it was intended to check. The gloomy pessimism of the gospels and epistles, as to the believer's prospects and hopes in this world, "They that will live godly in Christ Jesus shall suffer persecution." "For if in this life only we have hope, we are of all men most miserable," "In this world ye shall have tribulation only," "Woe unto you when all men speak well of you," "Mortify the flesh with the affections and lusts," and scores of similar jeremiads are bad enough, but they have been "bettered" by the Church in all ages since. The simplest statements have been distorted and even omis-

sions turned to account. We have been gravely informed that Jesus never smiled though he is recorded to have often wept, and "For every idle word that men shall speak they shall give an account in the day of judgment" has been interpreted to forbid jesting and light-hearted conversation of every description. There is no more saddening page of the history of mankind than that which records the results of stoning one of the greatest of the prophets of the Most High. From the denial of the holiness of joy, have come the essential meritoriousness of self-denial and suffering, the righteousness of gloom, the piety of self-deprivation and torture, the sanctity of dirt, the holiness of ignorance, and the whole dance of delirium and carnival of unreason which has at last died down, thank Heaven, to a few, feeble infantile prancings in strict evangelical circles around the pillory in which are exhibited those chief and most potent snares of the Evil One, dancing, cards, and the theatre. The merest reference to the facts is sufficient argument against the position, and indeed modern orthodoxy has at last recognised the error of it and modified its "interpretations" of scripture to meet rational views. Even from the innermost circle of the evangelicals comes the message, cheering both in its eminent good sense and frank, Saxon bluntness, "many Christians think themselves pious when they're only bilious." (Bishop Vincent.)

And yet in spite of this great object-lesson of the utter failure of reprobation and denunciation, a chorus of protests arises at once on every hand, the moment it is even suggested to officially recognise joy as an aim and pleasure as a guide in conduct. And this in spite also of the further fact that both biology and medicine have abundantly proved that three-fourths of the actions and things which give us pleasure tend to the advantage of both the individual and the race. The great dread seems to be that an era of licence, of self-indulgence will be thereby established at once. But a glance at this fear will show it to be really unfounded.

In the first place this change brings joy, as it were, from the outlaw of a despotism, to a citizen of a republic. Instead of being less amenable to law and reason than before, it is made more so. The mere recognition implies the presence of an element of reason

and utility which can be estimated and its legitimate weight and limits defind as accurately as that of any other righteous motive. Instead of regarding it as an impulse which *will inevitably* at times be yielded to without reason and in defiance of authority, its indulgence is freely granted, so far as it can defend itself on rational grounds. To use a somewhat changed metaphor, the robber-baron has become a member of Parliament.

Secondly any pursuit of joy carried to excess becomes a failure, judged solely from an esthetic standpoint, promptly defeats its own aims in fact.

Take a mere gastronomic indulgence and the pleasures of sweetness, and beyond very moderate limits, it promptly results primarily in blunting the tongue and clogging the palate to the verge of disgust, and secondarily in a colic or an attack of biliousness. The penalties of excess are much greater than the pleasures of indulgence. An enjoyment of minutes is matched by the discomfort of hours or even days, and from a purely hedonistic standpoint the balance is heavily upon the side of moderation. And in those cases in which discomfort is not actually induced, excessive indulgence soon blunts or even destroys the capacity for pleasure. In fact moderation and control are absolutely necessary to successful self-indulgence.

These of course are mere truisms, but it is really surprising into how highly moral a course of conduct, the intelligent pursuit of pleasure alone, with an eye to permanence and the many-sidedness of man's needs in this regard will lead us. Indeed several celebrated systems of morals have been based upon this impulse alone, under different names, from the epicureanism of early days to the "refined selfishness" of Bentham, and the "utility" of Spencer. Morality is not authoritative but essential, not artificial but natural and self-existent, and a large measure of it will be attained by the intelligent and effective conduct of life from any *natural* standpoint whatever, whether utilitarian or esthetic, instinctive or devotional, spiritual or material.

We are so apt to judge every impulse or tendency by its most striking results in other words by its extremes. The instant that a

"life of pleasure" is mentioned, the image, that involuntarily springs up in our minds, is that of the idler or the rake. And yet either of these judged by even the briefest "life" standard of pleasure alone, is a colossal failure. Pure idleness, though a delightful relief after arduous toil, whether bodily or mental, has the feeblest staying powers of any pleasure that can be mentioned, indeed it *is not a pleasure at all*, except by contrast. And the contrast fades out with wonderful rapidity. Enforced, beyond a few hours or days it becomes absolutely intolerable and the most excruciating torture which the wit of man can devise.

The moment a man succeeds in reaching the "leisure-class," he sets to work to get rid of his idleness almost as energetically as he did before to obtain the privilege of it. The nobler sort of the "upper classes," the real "aristocracy," of every land, whether hereditary or otherwise, take their duties and opportunities seriously and work just as hard and self-denying as any "laboring class" in the community, simply to make their lives tolerable to themselves. While the baser sort make just as much of a business of pleasure-hunting as any banker does of money-lending or farmer of stock-breeding, and *get not a whit more of pleasure out of it.* If they succeed in their "business," they enjoy life, but so does any man who succeeds in his occupation, no matter what it is, and the percentage of "bankruptcies" is high among them. Pleasure is like several other things in the world, the surest way not to get it is to aim directly and deliberately at it. As for the rake and the hard drinker, instead of getting the most pleasure out of life, no one with his equal opportunities gets less. There is a wild delight in sowing "wild oats" but a painful laboriousness about the reaping of them. And there is a "sure crop" and apt to "bring forth thirty-fold."

Considered as a pleasure-crop, they are a ghastly failure. We have the unanimous testimony to this effect not merely of the moralists, but of the rakes, the libertines, and the wine-bibbers themselves. And when these two classes of worthies agree, the point may be considered established. In the case of wine-drinking, for instance, leaving out of account its value as food and medicine and

considering it simply as a means of pleasure, the man who succeeds at it is not the guzzler, but the very moderate drinker. To say nothing of the "difference in the morning," the heavy drinker so quickly blunts his palate and drowns his finer senses, that bouquet, flavor, sparkle, play of color, vintage, etc., are utterly lost upon him. The poorest possible way to really enjoy wine or whiskey is to drink hard. The man who gets the most pleasure out of drinking, not only infinitely in the course of his life but even at the very moment of imbibing, is the man who drinks his Burgundy or Port by the glass and his whiskey by the ounce, and not the one who gulps his champagne by the bottle and his whiskey by the pint. No one gets less pleasure out of alcoholic beverages than the drunkard—except the total abstainer. Therefore they naturally unite in abusing wine and the moderate users thereof. Every natural joy-instinct, when it has attained a reasonable and legitimate gratification of itself, has fulfilled its function and promptly disappears, leaving its place to be filled by the attraction of the next need of the organism. No man ever got drunk by instinct. He has in the first place to "learn to like" the taste of all but the weakest liquors, and even then, after drinking a moderate amount, he is much more unpleasantly affected, in nine cases out of ten, by the fulness in his head, the thickness in his tongue, and the vagueness in his legs, than he is pleasantly affected by the taste of more whiskey. If men would always stop drinking just as soon as they ceased to enjoy the taste of their wine or whiskey, there would be much less drunkenness than at present. Indeed, the habitual drunkard can hardly be said to be urged on by real pleasure-impulses at all. Certainly not by any natural ones but by a morbid craving first for excitement and then for delirious self-forgetfulness.

One of the most frequent objections urged against pleasure as an aim is its extraordinary evanescence. In the famous lines of Burns:

> "Pleasures are like poppies spread,
> You seize the flower, its bloom is shed,
> Or like the snow-fall in the river,
> A moment white, then melts forever."

But as a matter of fact this is one of its chief advantages. They are so irresistibly attractive that if they did not promptly fade upon realisation, poor, weak humanity would be in great danger of being incessantly impelled in one direction to its ultimate undoing. But every instinctive pleasure is capable of "gratification" which extinguishes it completely, for the present at least, and leaves the field clear for attraction by the other needs of the organism. There will nearly always be found to be much that is artificial and unnatural in any craving which leads to excessive indulgence of any sort. Natural desires fade like the rose, in the very act of fruition. "The full soul loatheth the honeycomb,"—but unfortunately not always the wine-cup. Man's *natural* pleasure-impulses and desires, if followed as they present themselves in their turn and each one permitted to take precedence of the others, according as its need is greatest, would lead him extraordinarily close to the pathway of health, not only physically, as we have seen in the chapter upon Instinct, but morally also.

The most serious misjudgments of pleasure are, we believe, based chiefly upon an oversight and a misunderstanding, an oversight of the inherent manysidedness, one impulse taking the place of another so easily and frequently that no one can lead to excess. To employ an apparent paradox, man is literally saved from pleasure by pleasures. The misunderstanding arises from a lack of comprehension of the real nature of pleasure.

As to just what is the essential characteristic, which in all cases makes a sensation or action pleasurable, we are still entirely in the dark. We do not even know what invariable attribute distinguishes it from the painful, indeed by most of our modern psychologists this entire group of sensations are classed together in what is termed the "pleasure-pain" series. About all that we can say definitely is that both are due to variations in the intensity of stimuli and appear to be opposite ends of the same scale of vibrations. Hence, "Variety" is literally "the spice of life." Nor does there appear to be any constant relation between the intensity of the stimulus or the suddenness of its variation and its pleasurable or painful effect, except that violent stimuli and abrupt variations

seem to produce painful rather more often than pleasant sensation. Probably the nearest approach to a definition and distinction, and one which certainly applies in a very large percentage of cases is that of Marshall, that pleasure is the result of any stimulus the response to which is easy and adequate and draws only upon such energy as is already stored up in the organism. When the response to the stimulus is inadequate and difficult and draws, as it were, upon the energy needed for the very life of the tissues, then pain results. This rule will not apply, by any means, in all cases, but it will probably go further than any other characterisation that has been attempted.

And when we come to apply this definition in our discussion, the problem alters greatly. If pleasure includes not merely actions and responses which are generally easy and require the expenditure of but little energy, but also those involving the liberation of large amounts of energy, *providing this has already been stored up*, so to speak, then will the reproach of "lotos-eater" be removed at once. And this definition is strikingly true in practice. A life which is "all bed, beer, and skittles," as the old phrase goes, is by no means the ideal life of pleasure; on the contrary, the keenest and most lasting pleasures of life are those which result from the most strenuous exertions, the most patient and skilful generalship, and the assumption of the greatest possible risks. Men love success far more than ease and honorable risk than dishonorable safety.

To say that the intelligent pursuit of pleasure will inevitably or even usually land men in either the idiocy of idle luxury or the insanity of dissipation, is a foul slander upon humanity. The pleasure of merely plucking and eating ripe fruit however luscious, is tame and insipid beside the triumph of stalking the elk or bringing the wild-boar to bay. To roll along the level highway upon the softest and most luxurious of carriage-cushions, is not to be compared for a moment to the delight and exhilaration of a wild dash across country, risking, if needs be, limb and life at every fence and brook simply in order to "ride straight." I can conceive of no exhilaration more delightfully intense, outside of warfare, than that of the heaving bound beneath you of the thorough-bred hunter

as he rises to the six-foot hedge and you crane forward to see how wide the ditch on the other side may be. The hiss of the water along the half-buried gunwale of the reeling sloop, is a far sweeter music than the rippling of a thousand tiny wavelets upon the sandy beach, as you lie basking in the sun.

The thoroughly manly man enjoys not merely ease and luxury but also and far more, adventure, enterprise, danger, laborious work even. Ask any true sportsman and he will tell you that his real pleasure lies in the excitement, the strain and the tactics of the chase, not in the eating of the game. The hardest work of the world is done from sheer love of it, not from a sense of duty. And almost anything that a man can work vigorously at and with a fair measure of success, he will enjoy no matter what his feelings towards it when he began. We begin by working to earn a living and end by loving our work, if it be only respectable. There is a pleasure in doing whatever we do easily and well, no matter how unattractive it may be in itself. Hence most men really enjoy their occupations, no matter how hum-drum, and are very proud of the way they perform their daily tasks.

The attitude of most men and all animals toward their life-work is not that of a bitter and irksome struggle for the mere means of existence, but of vigorous and invigorating, joyous activity. The "curse of Adam" is an almost unmixed blessing. Vigorous and continued activity is not merely a stern necessity of existence, it is a means of progress and a source of constant enjoyment as well. The "struggle for existence" is severe, but it is joyous also, and successful until it is ended by the Great Rest-Bringer.

Life is long and full of action and color. Disease is short and death painless and instantaneous. "Weeping may endure for a night but joy cometh in the morning." Joy has as marked a preponderance over grief in the natural world, as good has over evil. Always excepting that part of it discovered and reported upon by that strangely-assorted pair of deponents, the modern realist with his filth-worship, and the ancient orthodox theologian with his devil-worship. No one sees more of the sorrowful side of life than the family physician. And yet no one will more unhesitatingly affirm,

that in ninety-nine cases out of a hundred, even after the most terrible destruction of limbs, of senses, of usefulness, after the crushing bereavement of those dearer than life itself, after a brief period the balance of life adjusts itself again in favor of, first, tolerability, then of joy. Not that the beam rises to the same angle as before, by any means, though it does this in a surprisingly large proportion, but that it does reach the level and a little more. No man who faces the situation bravely and works hard and honestly at the task which lies within his powers, need fear permanent unhappiness.

The edge of grief or disappointment is most mercifully dulled by the flight of time, the satisfaction which comes of honest work well-done, never fails. If there be anything of which both the physician and the Darwinist are firmly convinced, it is the wonderful adaptability of both the human and the animal organism. Given the bare possibility of existence which includes either the power of vigorous effective exertion, or of free communion with one's kind, and happiness will ultimately result in the vast majority of cases. The more closely and lovingly we study any class of animals or stratum of human society, and the more firmly we become convinced that happiness and not misery is the rule. And not by a bare majority either, but overwhelmingly. Life in all is a struggle, but it breeds a superb set of healthy, blameless appetites, the natural gratification of which is an abundant reward for every exertion. The very strenuousness of the struggle gives it an exhilaration as long as it is successful, and when it ceases to be so death comes swiftly and usually painlessly. And we must remember that in the lower animals there is practically almost no fear of death, in the human sense. It is doubtful whether they can even distinctly conceive of it and if they could, having never invented a theology, they would have little reason to dread it excessively.

The hunted animal flees *not* "for its life," for it is probably beyond its powers to imagine itself ceasing to exist, but to escape the pain which it believes the teeth or weapons of its pursuer may inflict, or very often in sheer, instinctive dread of his approach. "Despair" and surrender are alike unknown to it, and when it can

run no longer it turns to bay and dies fighting, probably feeling the fangs of its captors but little more than soldiers do the mortal wounds received in the thick of battle.

And I frankly confess that my own firm conviction is that a large proportion of the "wretchedness" and "unhappiness" of the world about us and below us, both human and animal, has been "read into" it unconsciously by our nobly-mistaken sympathy in our fellow beings. We should suffer both physically and mentally under such circumstances, and so must they.

In short, while as keenly alive as ever to wrong and suffering and as strenuous to right the one and relieve the other wherever he sees them, the Darwinist is in large measure freed from that crushing conception of the preponderance of suffering and disappointment in the life of the world, the *Weltschmerz* which exerts such a powerful influence over our views of life and destiny.

Nor does this joy of living fade or even waver in the face of death. "Life is short," the moralist warns us, but what of that? If it be brave, vigorous and joyous while it lasts, how could it be improved by being made longer? Death is simply the end of life, not its destruction or reversal and come soon or late it cannot rob us of a single joy experienced or undo a single triumph won. "The lily of a day" was the fairest thing the sun shone upon, and triumphed and will be remembered as such "e'en though it fall and die that night."

Life is short, but it is as long as we are; aye, and if we live to three-score and ten, as long as our desires. To know that it must end sometime need not in any way detract from our rational enjoyment of it while it lasts. So long as it continues it is good, and when it ceases, so do we, as individuals. The happiest life, if it had no prospect of ending, would become terribly monotonous. The only thing which could cast a permanent gloom over life would be the fear of its indefinite continuance.

The bucket brings up precisely a bucketful whether it be lowered into a hogshead or an ocean, once or a hundred times, and we get out of life precisely what we are able to contain and would get not a drop more if we lived to be a thousand. And we human

buckets are usually filled to the limit of our utmost possibilities before we are fifty, although we may keep on fondly imagining ourselves to be hogsheads. Unless our capacity could go on increasing indefinitely, which it obviously does not, we could get no more joy out of life in a thousand years than in seventy, except in the matter of memories. If such an increase could occur it would practically amount to the loss of our identity. And from the point of view of the effectiveness and progress of the race, we had much better do this by death and allow a new generation to take our place.

As for a future life in spheres celestial, we are simply in the Socratic attitude, that as we have not a scrap of ponderable evidence as to it's character or even existence we should be most irrational either to dread it or long for it.

We are fully content to

> "Live long and happy and in that thought die,
> Glad for what was."

Content to rest and to live in our memories, our descendants and our "works which do follow us," but otherwise unafraid of any awakening.

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AN ASPECT OF ATTENTION.

WE SUPPOSE that all parts of what we call the material world are connected, and in a multiplicity of ways. If any ordered set of connexions may be conceived under the notion of *system*, we may speak of the system of gravity, of the system of chemical action, the system of the conservation and transformation of force and so on—and these systems or connexions go on concomitantly in bodies without confusion or interference. Not only could things never be *known* except in relation to each other, but even from the point of view of gravity we seem forced to assume that nothing would be what it is, if it were not for all the rest. And from the implications of this admission, from many constraining analogies, and from innumerable facts of experience, we are convinced or persuaded that every material thing has further the capacity, developed or undeveloped, of being affected by, and re-acting to, every attribute or aspect of every other material thing. Look, for instance, at the phenomena of magnetic attraction; at the delicate differences of surface which correspond to differences of color and are perceptible to the trained and sensitive touch of the blind, at that wonderful correspondence between light-rays and colored surfaces, owing to which, if we eliminate, e. g., the yellow from a ray of white light, that mutilated ray falling on what we call a yellow surface, shows us not yellow but a shadow—at the recent development of photography, by which the skeleton of a living hand, or the compass enclosed in a wooden case can be accurately transferred to the surface of a photographic plate.

What can be said, or supposed, as to the psychical counterpart of this complex material connectedness of mind or minds as

finite, as conjoined with matter? It will be generally admitted that at that end of the scale of existence which in its psychical aspect is best known to us, we have mind intimately connected with what Locke calls "systems of matter fitly disposed"—can we draw the line anywhere between this, and the other end of the scale, and say "Here all psychical life ceases, and we come to the region in which (as far as the finite existences themselves go) there is *mere* matter?" Putting aside the difficulty of conceiving any matter as *mere* matter, this does not seem possible. We seem rather forced to some such conception as that of Leibnitz or of Lotze, according to which there is mind or *psyche* everywhere. If there is everywhere connexion of material elements and systems, and if all material elements have a psychical side or element or factor, then there is everywhere a thorough-going connexion between psychical elements. Each system from its own aspect or standpoint, so to speak, has its own connexions, material and psychical, some "systems" (e. g., those which we should call ideational) being primarily psychical—others (e. g., circulatory, chemical, gravitational) being primarily material. If we wish to investigate connexions in the region where the ideational connexions are primary, it is best to begin with the ideational aspect; at the other end of the scale, attention should rather be fixed in the first place upon the "material" aspect—this being better known to us in that region, as the other aspect is better known to us in the other region.

On the view here advocated, we suppose that there is no psychical change without material, no material change without psychical. The multiplicity of connexions that exist concomitantly in material things, sort themselves, so to say; phenomena of gravitation do not interfere with e. g. electrical or chemical phenomena; the enormous complexity is quite free from confusion. In certain material beings—that is, in organised bodies—we find besides all this, an obvious and specialised systematisation. This is not known through the "consciousness" of the being to which it belongs.

On the other hand, in the case of human consciousness, there are ideational systems which express the result of emphasis and selection in the region of conscious psychical life. At this end of

the scale, the *material* correspondent of the ordered ideational complexity is matter of inference—as, at the other end, is the *psychical* correspondent of that material complexity which itself is, to some extent, matter of observation.

If the elements of psychic activity and passivity, action and reaction, in human minds are (as Dr. Ward has, I think, made clear) attention (including volition) and feeling (pleasure and pain) —then, if there is, as has been assumed, a psychical continuity corresponding to the continuity in the material world, it must be *of the nature* of attention and feeling: and while, on the one hand, such phenomena as those of "double consciousness" help one to grasp and to admit the possibility, in connexion with conscious organisms, of some secondary consciousness (that the ordinary conscious self has no explicit knowledge of) on the other hand, the acceptance of such sub-conscious regions opens the way for an apparently plausible explanation of mental phenomena that are familiar and normal, and also of many that are abnormal and extraordinary.

My point is that admitting concomitance of psychical and material elements, a thorough-going connexion of (1) psychical and (2) material elements, and a systematised complexity of both orders of phenomena, it seems natural and indeed inevitable to suppose that, as in the material region, a multiplicity of connexions of different orders coexist in the same thing or creature, without interference or confusion, so in the psychical region, there coexist the psychical correspondents of these connexions. It is "attention" (in the widest sense) that keeps order (so to say) in the psychical region; and there are probably varying degrees of independence among corporeal functions and material systems—the one-ness of attention being that which on the psychical side, holds the systems together.

Of this "attention," however, that which goes to keep the functions of the lower systems in working order, is sub-conscious—since these systems are certainly not the subject of clear consciousness in normal human life, and it is not with them that the attention which we can ordinarily control is, in clear consciousness, con-

cerned. To sub-conscious ideas there must correspond sub-conscious attention—and I suppose that the difference between attention in the conscious and the sub-conscious regions is simply a difference of degree—attention in the sub-conscious department being of the same nature as the psychical activity which, in conscious life, we are accustomed to refer to by that name.

Possibly if we could know the consciousness of elementary animals, we should find in them psychical correspondents of physical processes—such as, e. g., those of circulation and assimilation—which are unknown to us, and a capacity of response which we do not possess, to powers and processes of physical nature. The unerring instinct of direction in bees and migratory birds, the memory of horses for a road once travelled, the way in which dogs and cats sometimes find their way by a fresh path to their old home, and other apparently still more mysterious endowments of sub-human creatures, may be explicable by possibilities of the distribution of attention which have ceased to be normally within the grasp of human beings.

In the *material* organism of such a creature as man, the connexion and "systems" are indefinitely numerous,—the whole is, we believe, subject to gravity, is chemical, is electrical,—there are the large systems of assimilation, of circulation, and so forth,—even the blood corpuscle is a complex and systematised thing, having its own peculiar function; and the steady imperceptible growth and renewal of the organism as a whole is a kind of summation of innumerable growths and renewals of minute elements, each of which seems to go of its own accord about its own work.

On the supposition that all these *material* elements, systems, and connexions have their *psychical counterparts*, a human being looked at from the *psychical* side must be regarded as correspondingly complex.

The various minor psychical systems may be regarded as his in a very real way, although not normally matter of consciousness to him; for they can never be directly known to any other conscious being, some of them seem on occasion to enter his region of ordinary consciousness, and there is perhaps little doubt that as

constituents of his "subconscious" region they determine importantly the whole character of his conscious life. Further, it must be supposed that all are related to the particular stock of attention attributable to him,—an excessive demand in the conscious region may upset some sub-conscious region,—e. g., violent exertion, mental or physical, may disorganise the digestive system, and therefore its psychical correspondents,—an unusual sub-conscious demand may affect the conscious region,—e. g., a person who is not very vigorous in health finds that, after eating food, his power of conscious attention is temporarily diminished.

On this view it appears that the whole world does in some degree affect every constituent of it,—the advantage of a human being over one of his elements consisting certainly in enormously greater grasp and complexity, and presumably also in greater clearness, in the possession of "self-consciousness," and in the capacity of having normally at command a certain fund of what may perhaps be called "free" attention,—meaning attention that may be applied now in one direction and now in another,—while in the various sub-conscious departments there is probably no normal surplus of attention, nothing beyond what is occupied in maintaining the sub-conscious systems.

The fundamental and primary "systems" of gravitational, chemical, electrical, magnetic connexions are, as far as our knowledge goes, not susceptible of disintegration, disturbance or modification: they seem a kind of permanent basis for all the rest; it is the ideational systems that seem most susceptible of change, and this is what might have been expected, seeing that they are for the most part established within the life-time of individuals. The systems which belong to organised bodies as such seem to hold an intermediate position, their tenacity being less than that of the primary systems, greater than that of the ideational ones.

Perhaps, if we may believe that there has been a chronological development from the primary to the organised, and thence to the ideational, it may be held that at each stage upwards there has been a fund of free attention available (the advance being thus to some extent analogous to what happens in sociological development

generally). Unless we suppose something of this sort, we seem reduced to the position that, at some point, the psychical element of attention suddenly emerges from non-psychical antecedents.

Even within the region of the ideational systems we find that numerous sets of connexions are consciously formed; and then, becoming automatic by repetition, fall into the region of sub-consciousness,—this happens, e. g., with the movements of walking, writing, speaking, playing on musical instruments, and so forth. Here a distinct consciousness of the various movements involved in the practice of the art has become difficult if not irrecoverable. It was perhaps only on condition of the movements becoming so, and thus setting attention free, that the acquisition of the skill was made possible.

Of that which is normally, though not all at one time, matter of clear consciousness to us, all but a fraction is at any given moment in the sub-conscious region. That this is so we explain by reference to the "narrowness of consciousness," which together with the multiplicity of ideas and presentations make selection and emphasis the indispensable conditions of our conscious life.

Although to all that is thus in sub-consciousness we must suppose correspondents in the material region, what exactly these are, in many cases it may not be easy to say. It is, however, undoubted that certain lesions and other injuries of various tissues and organs have a powerful influence upon psychical life,—whole "systems" may be abolished or distorted, as consequent or concomitant of physical changes. And there is no commoner experience than that different bodily conditions are connected with different psychical conditions. Bodily fatigue, hunger, cold, warmth, due nourishment, even mere difference of bodily attitude (as Lotze points out) carry with them important modifications of the psychical life. It is probable that explanation is to be sought in alterations in the distribution of attention. There have been curious cases of what is generally referred to as lapse of memory, in which patients after some shock, or bodily illness or injury, seem to have lost hold of most of the past events of their life, or (even sometimes from mere disuse) of some particular region,—it may be some system of con-

nexions, or the ideas traceable to some definite tract of time. I knew of a case where, as an apparent result of illness, initiated, I believe, by some mental shock or trouble, memory of all that had happened for the year past entirely went, coming back suddenly after some months. That what immediately preceded some great shock or change is in varying degrees irrecoverable in memory is a phenomenon of every-day occurrence. (Cf. all cases of concussion of the brain.) In another case known to me, a person of great intelligence suffering from nervous illness (spasmodic asthma) seemed to lose all sense of the lapse of time, and was unable to address letters or write cheques,—she was quite aware of these particular disabilities and apparently keen, clear-headed and intellectually capable in other respects. A curious circumstance in this case was, that the sufferer had been a person of extraordinary punctuality, and had all her life kept up a large correspondence, and been in the habit of managing her own business affairs, including the writing of cheques: punctuality amounting to fidgetiness was a kind of passion with her. In such a case as this, might it be surmised that the material elements concerned had been to some degree exhausted or disorganised by excessive stimulation? And if so, the psychical inability here might be due to the actual absence of a (material) condition necessary to the very existence of the (psychical) objects to be attended to. In the previous case the dislocation of attention seems to have been initially connected with bodily disorganisation.

In such cases the psychical changes may, it seems, be regarded as changes in the distribution of "attention," these being apparently concomitant with bodily modifications. It seems that the phenomena to which Prof. Wm. James refers as distinctive of *all* emotion, and which indisputably *are* present in some cases of emotion—i. e., the apparent antecedence of bodily to mental disturbance[1] may be very plausibly explained (psychically) by reference

[1] On this Professor James bases the view that emotion is a consequence, not the cause, of the bodily expression. "If," he says, "we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind." (*Principles of Psychology*, II., 451.)

to alteration in distribution of attention in the *sub-conscious* region. For the bodily phenomena referred to—palpitation, trembling, pallor, etc.,—have (as psychical concomitants) elements which are normally in the sub-conscious region, and these are presumably in close connexion (through previous association or otherwise) with other sub-conscious elements, which are the psychical correspondents of the bodily changes aroused by, e. g., the smoke of a house on fire, the roar of a wild beast, the scream of terror or distress, and so forth. I suppose the order of occurrence in such cases to be that, e. g., the smoke of the fire affects perhaps the organs of smell, and perhaps those of respiration—to these bodily effects there correspond certain psychical modifications in sub-consciousness, connected by association with other psychical phenomena which have as bodily correspondents, trembling, pallor, etc. Conscious terror, rationally based on the thought of the danger threatened, with its concomitants and results, is perhaps the final term in the series.

A person who is very sensitive to vitiated air, and has often been made faint by it, will faint at the very idea of not being able to get out of a crowded room—such a phenomenon seems explicable by a similar reference to sub-conscious connexions.

A very curious and interesting case of interdependence between sub-conscious states is recorded by W. Jerusalem, in his book *Die Urtheilsfunction*, where he relates of a German poet, that, having thought out and partly composed a play that he had planned (much of it while playing piano-forte duets with his mother), the completion of the play and the writing it out were hindered by his mother's death and a visit to Italy. When he returned to his drama, he found it impossible to recall the scenes and speeches he had worked out—every effort of recollection was in vain. At last it occurred to him to play over again the same duets, and as he was playing them, all the scenes and imagery he had thought of before, came back to his mind. (Cf., returning to the room, or place, where one had thought of something, in order the better to recall it to mind.)

It seems unavoidable in talking about such connexions to in-

clude under the one name *sub-conscious* both what must be supposed to be normally altogether in the sub-conscious region, e. g., cognition of the proximity of metals or poisons,—and what normally alternates between that and the region of consciousness—e. g., our knowledge of any subject with which we are acquainted,—as the linguistic knowledge of a classical scholar, the scientific knowledge of a botanist, or the every-day knowledge which is common to all of us, though not always present to any one. Stevenson describes in his *Vailima Letters* how he once found himself shaken and trembling without knowing why, and on reflexion became aware that something in the present environment strangely resembled scenes in which his youth had been passed. Here explanation seems possible by reference to sub-consciousness, and to the alteration in the distribution of attention due to the force with which the presented scene acted on sub-conscious connexions.

Again, one often *feels* a mistake before one clearly *sees* it; or one feels something to be delightful or objectionable before there is any clear consciousness at all of why and how it is so—what is for the moment too complex or too wanting in clearness to be grasped by the conscious intelligence, appeals to sub-conscious connexions.

May not one also find in such considerations a clue to the enormous force of early associations, custom, prejudice, "authority," and the extraordinary difficulty that is often felt in appreciating a strange doctrine or fresh point of view, or learning to see the error that lurks in a familiar theory?

Every learner probably knows what it is to understand some view or assertion so far that he cannot refuse to accept it, while yet some dissatisfaction remains because it does not seem to come home to him, as it were. Nothing in consciousness hinders, but sub-consciousness is not yet in harmony.[1]

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[1] This suggests the question whether there would be pain if it were not for sub-conscious connexions (connexions of sub-conscious systems), and the demand made by these upon the attention which seems normally under our own control. To "physical" pain there corresponds injury or disturbance of some bodily function or connexion. Is it possible that all feeling is due to the action of sub-conscious

It seems possible to regard "physical" pain as the effect in consciousness of some sub-conscious disturbance which causes a slipping away from, or losing hold on, relations with other things. Pain considerable in degree or amount seems always to entail an appreciable weakening of the hold on life, and life appears to be bound up with the due maintenance of sub-conscious systems and functions. When pain appears to be more intellectual in origin, to be primarily dependent on dislocations or disturbances of attention in the ideational region, an analogous explanation seems plausible. There are here conflicting claims on attention due to some kind of ideational want of organisation. Such may occur when there is intellectual contradiction or discrepancy, or a failure to understand, —or a conflict between duty and inclination, or between desire and fact. There is a disharmony causing distraction of *attention*. This view does something to explain the pleasure that goes with talent or general capacity—and perhaps the widespread love of power—also possibly to some extent the delight of discovering or inventing, together with men's ordinary unwillingness or slowness to accept new views, theories, or customs. (It also explains their acceptance when this is willing.) It is this bias that tends to make eccentricity and all divergence from established custom so unwelcome,—and similar considerations perhaps apply to cases in which, e. g., some particular form, or color, or flavor is disagreeable, it may be to the point of painfulness, apparently only because it is *strange*, and therefore at first productive of some nervous or other

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connexions? In some curious recorded cases of disordered nerves (?) we hear of a wretched sense of far-away-ness and unreality of perceived objects, in which it looks as if the painful feeling were psychically connected with disturbance of sub-conscious connexions. If it were possible to sweep away sub-conscious connexions leaving only clear consciousness—is it not probable that all feeling, interest, pleasure, and pain, would go too? Do sub-conscious connexions play a prominent part in connecting each one of us with the rest of the world? Is it possible that feeling, seems what in psychical life is most immediate and individual, is the expression to the feeling subject of connexions between him and other things?

We believe it reasonable to consider that inorganic substances are not susceptible of pleasure and pain—is this connected with the fact that there is no surplusage of the element which in them corresponds to attention, and no possibility of disharmony or dislocation, psychical or material, between the elements or systems which they comprise?

disturbance. There is probably a *degree* of strangeness which would disturb or even destroy health of body and of mind, or even life itself. May we find here some clue to the inexplicable terrors that seem to affect infants who have never in their own person experienced anything but the kindest and gentlest treatment? When a very young child screams with (apparently) fright at sight of some new face, or perhaps of its mother or nurse in a new bonnet, or wakes from sleep with every appearance of having been terrified, may it not be suffering from the disturbance produced by pure strangeness (of presentation or idea), and be merely feeling the . . . . "blank misgivings of a creature moving about in worlds not realised?" Perhaps also inherited associations, or sub-conscious disturbances may be sometimes to blame. I am reminded here of a case in which a descendant of a clergyman who had been rector of Chillingham, always if he had pleasant dreams imagined himself to be wandering through the beautiful woods and grounds of that place, which to him personally were not in any special way familiar or delightful. His theory was that they had been specially delightful and familiar to the child of this rector who was his own ancestor and that this explained the recurring dream. And it may be some felt disharmony or want of explanation (which when perceived causes a sense of disharmony) that drives men to the "restless cause-seeking" that comes with leisure of attention.

If the more fundamental sub-conscious systems bring us into specially near and immediate connexion with the rest of the world in some of its aspects, the extraordinary power of talent or genius in tracing out the truth in certain regions, and getting that grasp of real connexions which is necessary for great constructive achievements, may be due to an abnormal development of some sub-conscious department, conferring special power to penetrate a particular set of real connexions. The alleged frequent concomitance of mathematical and musical ability seems interesting here, the relation between music and mathematics being really so close and fundamental, though on the surface, and to most people, no two things could be more different and unconnected.

Is the suggestion absurd that with the fundamental and abso-

lutely unchangeable nature of quantitative relations—which like all others have psychical correspondents in sub-consciousness—there is connected the unique certainty and convincingness of mathematical truth to every one in as far as he can understand it,—in the whole region of normally sub-conscious life there can be nothing that conflicts with them.

Simply thinking about something often enables one to see more in it; and often after sleeping, or ceasing to consciously think of some difficulty, the difficulty seems to have cleared itself up,—it seems natural to explain such phenomena by sub-conscious psychical activity.

The literally killing grief which old people sometimes suffer from losing the companion of years, or from having to leave the cottage they have lived in perhaps all their life, may possibly be explained, I think, by reference to the disturbance cæused in sub-conscious regions,—perhaps the "home-sickness" of the Swiss may be of a similar nature.

In æsthetic emotion again, reference to the psychical region of sub-conscious systems with their far-reaching external connexions, affords perhaps the best promise of something like an explanation. The influence of music, for example, in most cases where it has emotional effect, is not explicable by reference to the past or present conscious life of the individual affected,—but it is not difficult to believe that sub-conscious connexions with the sound, the rhythm, the movement, the feeling expressed in it, may stir the soul to its depths. A person may be intensely stirred by music, e. g., of Beethoven or Wagner, without having the faintest idea of what, in an intellectual sense, the music *means*,—but it quickens in him connexions deeper than ordinary consciousness, because it was the outcome and expression, in the composer, of a stirring of just those depths.

Can anything like an explanation of the phenomenon of sleep be suggested on these lines? It seems to me that it can,—that what occurs in sleep is a release of "attention" from objects that press upon it through sight, hearing, etc., and the systems with which these objects are most strongly connected; the "attention"

thus set free going to reinforce the sub-conscious psychical correspondents of corporeal processes of nutrition, renewal, etc. Any unusual demand on the part of corporeal functions or processes is liable to interfere with the movement of attention in the region of conscious ideation,—a great demand on attention, from the intellectual side, tends to be unfavorable to the best carrying on of bodily processes. Every one recognises, for instance, that immediately after dinner is not the best time for hard study,—and that unremitting mental application is liable to lower the condition of bodily health.

If at any time attention continues to be aroused by environing circumstances, sleep is impossible, and similarly if it has been riveted by intense absorption in some intellectual problem. Also, if there is some distinct organic disturbance, perhaps rising into consciousness, or some special demand on sub-conscious attention so great as presumably to hinder the general subsidence of attention to those regions in which the work of renewal and reintegration is carried on during healthy sleep, sleep is prevented or disturbed. The discomfort or pain of illness, for instance, or of indigestion, may hinder or spoil sleep. It must be some vitally necessary work that is carried on during sleep, and that cannot, it would seem, be carried on during the waking state, since—as is well known—nothing is so exhausting as continued sleeplessness—there is no substitute for sleep—though a person may do with less if he exerts himself less, and the strong can do with less sleep than the weak. Also it seems that in some cases, food can to a certain extent take the place of sleep and do its recuperative work. There is an account of some pedestrian travellers, who after suffering greatly from fatigue, tried the experiment of taking food every few hours. From this time forward their fatigue seemed to vanish. And probably most people have found that a slight meal has sometimes the effect of dissipating weariness, and re-inforcing the capacity to work. In children the tendency to sleep and the capacity to sleep may be due partly to the large demands made by growth—partly, especially in infants, to less sensitiveness towards external and ideational stimuli. People are often very sleepy after suffering great pain;

and after illness, also, or in great weakness, when we may suppose that there is much corporeal reintegration to be done, an abnormal amount of sleep is frequently required. (Cf. Mr. Durham's investigations.)

It seems as though the conscious life of man had reduced the sub-conscious life to subsist during waking hours with the minimum expenditure of attention and that this arrangement cannot be carried on without constant intermissions.

It has been questioned how far sleep is ever "dreamless." No doubt sleep is not always succeeded by any memory of dreams, and often when we awake, knowing that we have dreamed something, we are conscious that our dream is escaping us. Occasionally, when it seems on the point of being remembered, some outside disturbance—a noise, indicating some occurrence, which attracts our attention, a bell ringing or a clock striking which warns us that we must get up, or the arrival of some letter supposed to contain news which we are anxious to hear—puts it out of our head, and it becomes henceforth apparently irrecoverable. When we do not remember anything, we still probably have dreamt, in some fashion —either something not apprehensible or reproducible in our ordinary consciousness, or something not vivid or coherent enough to keep its place in memory, or something which is pushed out of consciousness when we awake by more powerful claimants for attention. It is thought that so-called "dreamless" sleep is best and most refreshing—in such sleep it is probable that there is the most complete release of attention from the "conscious" region which generally absorbs it,—illness, indigestion, bodily discomfort, intense stimulation of ideational centres, seem to cause much dreaming, often of a painful kind. In such dreams some terror of childish days may pursue one, all the intervening experience which has deprived it of power over waking life, being absent from recollection. It often happens that people who are somewhat overworked, or unduly excited by some intellectual interest, are haunted in dreams by that which has held their waking thoughts—possibly in some grotesque form—an examinee, for instance, dreams that he is a Latin Grammar, or that some one shows him "photographs of

young examinations." Some highly imaginative people dream long coherent stories which they can afterwards retail. Perhaps in this case sleep has been preceded by intense stimulation of certain ideational systems.

If the "dreamless" sleep is most healthful and restorative (possibly there is little doubt about this) the fact may be explained by the suggestion made above, that the function of sleep is to restore and re-integrate in sub-conscious regions, by temporarily reinforcing their stock of psychic energy. If the attention withdrawn from response to the external world hovers upon the confines of the ideational region, it must be, so far, hindered from carrying out the normal re-integration of sleep.

It is not merely in respect of its artificial origin that the sleep of hypnotism differs from natural sleep. In the hypnotic sleep, the attention detached from the environment is not left free to spend itself wholly in reinforcing the activity of some sub-conscious region, but is ordinarily attached to the hypnotiser in a manner which certainly seems mysterious, but is similar, in the view of Dr. Bernheim and others, to familiar cases of attraction and soothing,—such as where a mother sings and rocks her child to sleep—or perhaps where one person "manages" another according to the current phrase—or averts (or rouses) a storm of temper by steering clear of, (or leading up to) some dangerously exciting topic. It seems, however, probable that *some* reinforcing of regions generally sub-conscious is a normal feature in hypnotic sleep. Such a supposition affords a more or less plausible explanation of certain hyperæsthesias observed in mesmerised patients—e. g., sensitiveness to the neighborhood of metals or poisons, the influence of the magnet, the different effect of upward and downward passes.

The inexplicable and violent *repulsions* that some people feel towards certain animals is due perhaps to some similar but more permanent distortion of attention, and intensification of ordinary obscure connexions. The curious limitations of "consciousness" in some cases at least, of hypnotic trance, may perhaps be partially explained by considering that the attention which has not subsided into the sub-conscious region is directed by the hypnotiser to only

a certain number of objects, and it is consequently only the systems to which these objects belong that enter into his trance-consciousness. It is probable that in all cases of change of consciousness—in dreams, hypnotic trance, "double consciousness," under the influence of anæsthetics, when carried away by some intense excitement or interest, or affected by some shock—the explanation of failure to remember, in the recovered normal condition, what happened in the abnormal state, is similar. There is presumably in all these cases a very important alteration of sub-conscious attention, and a very peculiar and limited direction of attention, in what for the time we call the conscious region—the abstraction of attention from the ordinary waking environment being no doubt an influential factor in determining the character of both the conscious and sub-conscious conditions. And when we consider how difference of mood (= ? difference of sub-conscious states) in ordinary waking life may affect intellection, how some persons seem mentally and morally transformed by a thunder-storm, how different surroundings, the presence of different persons, the reception of some distracting or delightful piece of news, may alter the whole face of the world for us—and remember that on waking from sleep or hypnotic trance, our senses and perceptions are re-assailed by the most familiar and powerful stimuli—it does not seem inexplicable that memory of the past state should fail, especially when the frequently strange, disjointed, and grotesque nature of the dream or trance "consciousness" is taken into account—even in waking life, it is often impossible to *grasp* in a first presentation—(and much more to *remember*) a novel series of combinations even when the elements are quite familiar (cf., also ordinary cases of forgetfulness). And in certain cases—as of hypnotism or the influence of anæsthetics—where failure of connexion between the sleeping and waking is sudden and of the nature of a shock, shock on the psychical side being probably a sudden and considerable alteration or dislocation of the distribution of attention. In some cases certainly, where hypnotism or anæsthetics have been applied, the patient has when awaked a memory of conscious states which occupied his mind during "unconsciousness"—a hypnotised person, e. g., remembers what he

did and how he felt in obeying the orders of the hypnotiser, whom he was quite unable to resist—a patient under the influence of an anæsthetic for about thirty seconds by the clock and quite "unconscious" (as far as recollection goes) of the pain of an operation, remembers living through a lifetime of vivid and connected events during that portion of an ordinary minute—in such cases the trance may be comparatively weak, or the remembered consciousness unusually strong—or unusually analogous to the ideation of waking life.

A medical opinion has been recently expressed (I do not know how far it is generally held) to the effect that in operations under anæsthetics there is always, *somewhere, some* consciousnesss of what has happened. This is, I believe, supposed to be evidenced by, e. g., the expression of pain sometimes observed on the face of the patient before returning to normal life—perhaps also by the cries uttered during "unconsciousness" by patients who afterwards have no recollection of having *suffered pain* or *uttered cries*—the manifestations during "unconsciousness" are supposed to differ according to the completeness of the anæsthesia, and in some cases it has been recorded that the patient, though not feeling pain, had normal consciousness (retained in waking memory) of all the circumstances of an operation, e. g., in tooth-drawing.

A very curious case was mentioned (in a recent publication of the Society for Psychical Research) of a patient who underwent some operation under an anæsthetic and awoke unconscious of anything that had happened; but a few days afterwards, in a fit of neuralgic pain, recalled the minutiæ of the operation—her account when detailed to the surgeon being found to correspond precisely with what had happened.

The undoubted variations of relation between trance-consciousness (however induced) and normal waking consciousness may be explicable by many circumstances—the depth of the sleep, trance, or "unconsciousness," and the consequent dissimilarity of its psychical state to the psychical state of normal consciousness being no doubt an important consideration. But it cannot, I think, be supposed, that the trance-consciousness during operations, etc.,

is always a painful one—if it is so in some cases, it is probably, as above suggested, where attention has not been thoroughly dislodged from the region of ordinary consciousness.

It is said that sometimes in battle frightful wounds are inflicted of which the injured man is, for the time, totally unconscious—owing, no doubt, to the intense pre-occupation of attention—this pre-occupation having the effect of an anæsthetic in precluding both pain and the consciousness of being wounded—(though the *direction* of the abstracted attention differs enormously in the two instances). It would be interesting to know if in such a case subsequent remembrance or reproduction of consciousness of receiving the wound, or of the normally accompanying pain, would be possible. Many of us have probably had slight experiences similar in kind to that of the unconscious wounded soldier, though differing enormously in degree. The pain of toothache, e. g., may vanish from consciousness if one is very much interested, surprised, or frightened, and return with unabated force when the temporary distraction has passed.

It is perhaps not an uncommon occurrence for a very timid patient whom only the compulsion of violent aching has driven to the dentist's door, to discover, on arriving there, that the pain has ceased—for the time. In a similar way strong interest or excitement can triumph temporarily over severe fatigue.

We find, in cases like these, confirmation of Dr. Ward's suggestion that with consciousness of pain there is enforced direction of attention to some object in consciousness. But such cases also suggest that it is not *all* objects constrained attention to which causes pain, for the wounded soldier who is unconscious of his wound and in whom it produces no pain, owes that very unconsciousness to an overpowering attraction of attention in another direction.

Where there is severe pain, however,—indeed as long as there is pain at all,—the attention is forcibly held; pain thus hinders the free movement of attention, and the sufferer cannot attend to other things as he would if the pain were absent. Extreme fatigue (and even in a less degree extreme absorption, though not painful)

will also make it impossible to really attend to or care about anything—the weakness of ill-health and the weariness of over-work, may alike produce a kind of callousness that is real as well as apparent, for the time, but that can be reduced or removed by rest, or improvement in health. In such cases of insensibility, there is probably an intense demand, from sub-conscious regions, on the stock of attention at the command of the psychical *organism*.

Alterations of consciousness in abnormal cases, and as between hypnotic and waking states, and also cases so-called of double personality or multiple consciousness, seem generally explicable by reference to dislocations of attention in psychical regions, conscious and sub-conscious taken in connexion with physical modifications. No doubt such physical modifications accompany every conscious or sub-conscious psychical change—one could not be without the other—but in cases of definite bodily disease, what is "physical" seems to take the initiative, while in other cases the reverse holds.

Not to speak of the ordinary alternation between sleeping and waking, all of us have experiences analogous to these changes which in their extreme manifestations seem at first so strange—people who are subject to moods, or specially sensitive to certain influences, or who have felt any strong emotion of anger, fright, joy, regret, pride, or suffered from illness or anxiety, or cold or hunger or disappointment, or sudden relief of mind, know what it is to be a "different creature" at different times. Some explanation of why a hypnotised person sees or feels what he is told to see or feel, has been suggested above—analogous small cases sometimes happen in ordinary waking life. One thinks, for instance, that the window is open, and feels cold or detects a draught—it proves on examination to be shut, and then one concludes that the draught was only fancy.

The case of double consciousness may seem at first even more remote from normal experience, but certain somewhat similar phenomena seem very common. We normally see, taste, and touch at the same time—we walk and talk, or whistle and work, or count the clock and go on reading all the same—or write a letter, or play

on the piano, and carry on (a sort of) conversation, or knit and read out and at the same time think about something quite different to book or knitting. It is, I believe, a very common experience to read aloud or copy out in writing and not have any clear idea when we have finished of the general meaning (or even of a single sentence) of what we have read or written—and this the more as we have been the more careful to read distinctly or copy neatly and accurately.

What we have done cannot "be put to the account of thought," and yet without doubt the movement of our muscles and vocal chords had their psychical correspondents. In such cases the force of the established connexion between the successively present visual stimuli and the resulting movements of speech and writing counts for much. Somewhat similar are certain phenomena of what is called absent-mindedness. The cases that are retailed are mostly marked by some curious incongruity between simultaneous actions, or between action and circumstance. Take, for instance, the case of the old gentleman who, while pouring cream into his own cup, cried "Stop, stop"! feeling that enough had been added for his taste, but failing to realise that it was his own action that was increasing the superfluity. Of the same person it is recorded that once tapping on the table, as he had a habit of doing, his ear was struck by the sound, and he called out "Come in, come in! Why don't you come in"? not noticing that the tapping was due to the movement of his own fingers. I have known a person arrive at home after a day's shopping with an umbrella in each hand, and not the faintest idea of how, or when, one of them was annexed.

That a hypnotised person if ordered *not* to see a given object among others, should always seem to miss seeing it, has perhaps some parallel in the simple experience of looking over proofs with some special and narrow aim in view, e. g., that of correcting misprints, or revising the quotations in some foreign language, or of looking through a letter or exercise to see if the spelling is right, which one may do with an almost total absence of attention to any other point. Similarly, in bagatelle, one refrains from playing the black ball, or the "enemy's" balls at croquet, whatever position

they may, at a given moment, happen to occupy. In playing in the key of, e. g., F major, one automatically omits the white note whenever B is to be played (on the piano) and strikes a black one instead. How the object to be avoided is *recognised* by the hypnotised person may perhaps be explicable only by reference to supposed sub-conscious processes.

It seems quite possible that a knowledge of the past experiences of a person hypnotised or otherwise put into a trance (and even perhaps of the hypnotiser) might in some cases throw light upon the trance manifestations. Some very imaginative and nervous people have, I believe, the habit of living to a large extent in a region of fanciful constructions—they "tell themselves stories" and occasionally carry on the adventures of a given hero or heroine, month after month and year after year, at various intervals—very probably identifying themselves with some of their characters. This habit is sometimes carried on from youth to middle age.

It is possible that in such a subject, when entranced or hypnotised, the attention, displaced from its normal region, may be to some extent attracted to this fanciful familiar "system"—especially if some of the physical and psychical features of the trance-condition could be supposed similar to those ordinarily accompanying the flights of imagination. Abstraction from attention to the ordinary environment would certainly be one point in common.

(Perhaps the extraordinarily rapid succession of ideas which sometimes occur in dream, trance, etc., may be partly due to absence of the hindrances and demands due to purposes, external stimuli, etc.)

It seems possible that the reckoning of time which apparently takes place with astonishing accuracy in hypnotic subjects may be partly due to sub-conscious connexions with ordinary indications of the flight of time or the arrival of a particular date. Differences of bodily processes and conditions, differences of sounds indoors and out, difference of temperature and atmosphere, the general differences between night and day and seasons, the knowledge one has, often without conscious computation of the day of the week and of the month, have sub-conscious connexions, and may all have an important influence in directing the patient to the pre-ordained date and hour.

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REGRESSIVE PHENOMENA IN EVOLUTION.[1]

THE most paradoxical part of my theory of genius and its psychopathic basis is at once supplemented and confirmed by observing the contradictory phases of natural evolution, that all progress is based upon regress, that every evolutionary movement is based upon a regressive movement, that every new organ or degree of perfection acquired by an animal is formed at the expense of other organs in which progress has provoked a partial or total atrophy. The vertebrates, for instance, gain their greater individual power of defense at the expense of a diminution of their progeny. The superior animals and plants lose in adaptability what they gain in evolution, so that while inferior species may await indefinitely in lethargy the conditions favorable to their development without suffering from it, and withstand even for thousands of years a deficiency of air and water, or may even change their form and needs with a change in their environment (the *Mucor mucedo* for example which in the absence of oxygen transforms itself into a saccharomyces tube), the superior animals die on account of a few degrees of heat, dryness, or pressure more or less than the normal. The metazoans gain their increased differentiation at the expense of the almost eternal life which belongs to the protozoans, the only forms of life which possess the property of rejuvenation.[2] The

[1] Translated from the manuscript of Prof. Lombroso by I. W. Howerth of the University of Chicago.

[2] The protozoans in fact in addition to reproduction by gemmation and by division, have the property of rejuvenation. Two cells come into contact with each other, fuse, their macronuclei and micronuclei are exchanged and each is transformed into a new cell capable of regenerating itself *ad libitum*. *Vid.* Claus, *Zoologie*.

metameric species lose in their differentiation the power to reproduce themselves integrally if broken. Parasites pay for the high development of their reproductive apparatus with the loss of their nervous and digestive systems. Little by little as the animal becomes parasitical the alimentary canal is atrophied and the reproductive apparatus is developed. When the latter begins to function the alimentary canal is filled with cells which little by little destroy it and take its place in such a manner that by and by no trace of it is left.

So also it is at the expense of the tail and the gills, eaten up and digested by other cells, that in the tadpole the lungs and the extremities are formed; it is at the expense of the whole body, literally absorbed by the phagocytes, that during the chrysalis period the caterpillar is changed into the butterfly; it is at the expense of the legs that in the arthropoda the odoriferous glands, copulatory organs, ovipositors and gills, and in the gills flagelliform tentacles, and in the crustacea the swimming appendices and the reproductive apparatus, are formed.

Again it is with the loss of a set of wings that the diptera gain the balancers by which they guide themselves in flight, and it is with the loss of the chlorophyl, that is, of the power of assimilation, that the leaf gains its evolution into petals, stamens and pistils, into floating organs, and even into prehensory and digestive organs; and the loss goes so far beyond the transformation, i. e., it is so complete, that, as in the case of the *Lathræa squamaria*, the plant is no longer able to assimilate air and water, and would die of hunger like the animals if it had not the power of appropriating organic food. And man himself has lost an entire organ, viz., the tail, and many vertebræ, and his natural clothing of fur, in the acquisition of new cerebral convolutions and the abduction of the thumb, and he has lost also the limbic organ which so sharpens the sense of smell.

The white race in comparison with savages and many beasts has lost the sense of direction which even the smallest birds possess. And there are many facts which might be offered to show that with the invention of the alphabet and the development of

speech it has lost important faculties with which some peculiar public functionaries among the ancients, like prophets and magi, were endowed. And it is certainly true that the greater nervous intensity of the life of civilised man, and the greater conveniences of his life, are accompanied by a lesser acuteness of the senses, a weakened power of resisting external agents, a lesser invulnerability. And we of the nineteenth century pay for our greater analytic perfection acquired through the division of labor by the loss of our faculty of synthesis. We boast of surpassing our ancestors in morals, but we have lost their sense of hospitality, and their patriotic and religious altruism; and if we are not more cruel than barbarians we are able to contemplate their cruelty with indifference, as for example the massacre of the Armenians. And from time to time the infamies of Panama or the Roman Bank reveal to us even among our highest officials a corruption worthy of the Roman Empire.

What has been said of the animal species including man is illustrated in the history of nations, for we see peoples extraordinarily advanced in one direction presenting marked characteristics of regression. The Hebrews, for instance, followed Christ to communism, Moses to monotheism, realised some of the ideas of Marx in socialism, created exchange, formed the nucleus of the *bourgeois* capitalistic class, as now they stir up the fourth estate against it; present in fact indications of all the later results of evolution. And yet they adopted religiously the quippu (the alphabet with points) in their Talmud, used instruments of stone in circumcision, and in this latter custom preserved a relic of cannibalism. In political life they have always shown the two extremes of progress and conservatism. Having settled in a country for a time they preserved its customs, at least its manner of dress long after it had disappeared in the country from which they derived it.

England has developed the most liberal monarchy of Europe, has quietly put in practice the desiderata of the socialists, and yet it preserves the privileges of its lords who with its judges still wear the peruke and still use phrases peculiar to the time of the Normans. Beyond these superficial practices it has some deep-reach-

ing ones in its fetichism for the Bible, a book neither moral nor modern, and not always original; in its religious exaggeration going so far as to make Sunday idleness a sacred duty. Professing to be a positive and practical people the English maintain a system of division of measures and of money which is in opposition to all modern Europe, and which sometimes constitutes a considerable obstacle in commercial exchange and in scientific research.

The French who are distinguished in industry, in good taste, in fashions, in the arts and in letters, are yet in their excessive warlike passion, in their persecution of foreigners, in their veneration of academies and the nobility, in expecting everything from the government (which, however, they are continually reviling), in their preference of the word to the idea, but little removed from the Gauls. The Italians, superior to all in music, and to many in the sciences, the arts and letters, are still backward in economy, in social organisation, in industry, in commerce, and in true political liberty.

The fact moreover may be demonstrated experimentally. Feré (*Bulletin de la Société de Biologie*, 1896, p. 790) observes that when an egg is exposed to harmful vapors, or if there be injected into it substances soluble in albumen, or if it be subjected to a mechanical action, like placing it upon a table put in vibration by a diapason, the development of the embryo is arrested and a general retardation, or it may be a deformation or even a monstrosity, may be produced. However, it sometimes results in a development more advanced than would be expected from the time of incubation or in an embryo with one part deformed but as a whole more developed than the normal embryo which has not been so subjected.

It is known too that certain influences harmful to development if applied in a certain degree, are favorable when applied to a lesser extent. It appears then that agents capable of exerting an influence upon the development of an embryo resulting in arrest of growth, or deformation, may in the totality of development increase the growth, causing individuals to be produced absolutely superior and which present with partial defects a remarkable general constitution, while some individuals are created weak, deformed or ar-

rested in development. And so, he continues, the most civilised nations are distinguished by their number of exceptional beings, men of genius as well as the most depraved by vice and by intellectual perversion. If all these, he says, are variations and embryonic anomalies they should, however, be carefully distinguished from anomalies characterising degenerations which inevitably accompany evolution. The observation is confirmed by the fact that many regressive forms frequently bear signs of precocious evolution.

I have shown (*Uomo delinquente*, Vol. I.) that in criminals the wisdom tooth is frequently wanting, that the cranial capacity is often greater than the average, that there is a greater neofilia, all ultra-evolutionary characteristics, while they have the median occipital fossette, powerful jaws, and, a fact that is of more importance to us, a number of indications of atavism. Insane people and maniacs frequently present neofilia and great artistic activity, and idiots frequently display special aptitudes in which they become superior to normal men, some of them becoming true prodigies, as is shown by Dr. Peterson in the *Popular Science Monthly*, October, 1896, especially in arithmetical and musical ability, with a particular inclination to imitate in models, drawings, and pictures the objects which they have before them.

One of the most curious examples of this is "Blind Tom," a pure-blooded negro, born in Georgia in 1840. Born blind he showed no intelligence except for sounds. He could not speak a word, but he could repeat any sound which he heard. Merely by the aid of sound he could repeat Greek, Latin, German, and English texts however long after he had heard them recited, could play on the piano from memory any piece, however difficult to follow, and had learned by memory five hundred pieces of music.

Among cases of extraordinary memory in idiots Morel cites a cretin who remembered the date of the funerals of all the persons who had died in his parish within thirty-five years, with the names of those who had taken part in these funerals. Morel also cites the case of an idiot who could not count up to twenty, but who knew

the names of all the Saints in the Calendar with dates of their respective feasts.

As to the imitative faculty the most curious cases are cited. At the asylum of Earlwood there was an idiot who constructed a perfect model of a ship with all its more minute details. Geoffry Mind, a cretin who died in 1814, drew cats with so much skill that his drawings are preserved in all the leading museums of Europe. Gideon Buxton the famous lightning calculator who died in 1702 was stupid; and Zerah Colburn, exhibited at the age of six as a lightning calculator, could never learn anything. He had six toes and many characteristics of degeneracy. Dasah was absolutely a fool, and yet he could multiply mentally numbers of eight and ten figures. Zaneboni, of whom Ferrari and Guiccairdi recently spoke so acutely,[1] is very dull in everything that does not concern figures, has hardly any power of imagination and has very many characteristics of degeneracy, from which the learned doctors conclude that he is morally and mentally imbecile except in the matter of mental calculation.

I have already pointed out that precocity, as Ferrari and Guiccairdi also observed, and spontaneity are the specific characteristics of lightning calculators. And Ferrari justly notes that the memory in such persons is a primitive memory, purely sensorial and simple, by which a thing may be recalled and recognised with the greater part of its elements of fixation and with a clear aspect of the producing sensation without or with slight mental relation, while they are wanting in that secondary memory based upon representative association of sensorial objects, on account of which their imaginations are almost always visual. And among such the few who excel in their studies, like Gauss and Ampère, are lost. It is a question here of one-fourth genius to three-fourths imbecile.

From this to the normal degeneration of the genius the step is easy.[2] And it becomes necessary, almost fatally, that to the most highly developed form of genius should correspond a regression not

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[1] *Rivista di Freniatria.* Reggio, E., 1897.

[2] *L'Homme du Serie.* C. Lombroso, 2d ed. Paris, 1896.

only in other directions but also in the organ itself which is the seat of its evolution. And thus is explained the frequency of sclerosis, hydrocephalus, left-handedness, misoneism, pigmeism, moral insanity, paranoia, at the expense of which anomalies genius has been able to take root and develop.

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TURIN.

THE CAUSES OF INFECTIOUS DISEASE.

THE WISH "to know the cause of things" is as old as mankind itself. In medicine the scientific period dawned at the moment when the question as to the connexion of disease with environment was clearly propounded by Diodorus and by Hippocrates, "the father of medicine."

In former times men were generally satisfied, and they are frequently satisfied to-day, with the vaguest conceptions of things, conceptions based on the common ground of a search after animate causes or personifications. Universal knowledge is plainly unattainable in a given section of time; hence men have always been forced to piece out in imagination part of the lacking facts,—that is to theorise; and the form such speculation takes on is naturally in accordance with the measure of cultivation prevailing at the time. Even now, as is clearly shown by a glance at the conceptions of image-worship among educated and uneducated individuals and peoples, there is for wide strata of society an imperative necessity for personification, for animate cause. Men abandon the idea of such animate causes only after more profound thought and arrive first at a mechanical, then at a monistic conception of the universe. Guided by the pervasive, all-embracing law of the conservation of energy, the exact sciences have everywhere struggled through to a mechanical and in part even to a monistic standpoint. The extraordinary complexity of the phenomena which confront us in the consideration of the origin of disease doubtless accounts for the fact that up to this time no one of the conceptions in medical theory,—either the dominant ones or those in direct conflict with the ruling conceptions,—have been freed altogether from the

old mystical animism. For this very reason not only do scientific periodicals resound daily with the clash of antagonistic principles, but the conflict is continued in the daily press and even in the conversations on the street corners.

In the presence of the great pestilence which the Greeks before Troy ascribed to the arrows of the offended god Apollo, Homer makes the father of gods and men say:

"Lo, how men blame the gods! From us, they say, spring troubles. But, through their own perversity, and more than is their due, they meet with sorrow."

This notion that pestilences are punishments for sins, and that they can be combated by sacrifices, prayers, and pilgrimages survives to-day in the midst of civilised Europe, an example of the deep-rooted proclivity in untrained minds toward a search after the animate, toward ontological speculation. The convenience of this ontological conception has given to the bacteria, in pure mockery of all scientific thought, an opportunity to celebrate their resurrection as the true disease-entities. Now, indeed, every sewing-girl knows that these good-for-nothing bacteria are the cause of *Seuchen* —which is the good German name for infectious diseases. Given the specific germ and the supposition is that we know everything needful; methods of fighting the disease, of disinfection and of healing are mere unimportant details. We cannot enough scorn those older physicians who knew nothing about bacteria, but who could not bring it into harmony with their better philosophic schooling that these things should be suddenly presented to them in pure cultures and in beautifully colored microscopic preparations, as the *cause* of disease. But in truth a sound kernel lay in their criticism. It was in a kindred spirit that Liebig ridiculed Pasteur, remarking *à propos* of Pasteur's view that the yeasts were the cause of alcoholic fermentation, that one could not see causes. Physicians, however, were not embarrassed by such considerations and, under the influence of Koch's ingenious methods, it became a pastime to show the causes of disease in pure cultures; their amusement

[1] The passage in question occurs in the Odyssey I., 32–34.—*Trans.*

flourished even in the drawing-room, and the phraseology of the new game became popular everywhere

We shall probably best reach a scientific understanding of the significance of bacteria in the origination of disease if we consider briefly the chief ideas hitherto held concerning disease. The conception, now generally embraced, of a "specific" infectious disease presents itself first in the writings of the great English physician, Sydenham. By this term is understood a sharply defined characteristic malady which, in uncomplicated and "typical" cases, is clearly distinguishable in its course and symptoms from other diseases: measles, smallpox, scarlet fever, malaria, pneumonia, and cholera are such "specific" infectious diseases. It was precisely this individuality of the "typical" cases that pointed to an individuality of origin, and in exactly this general sense Sydenham first compared "species of disease" with species of plants. For this physician, therefore, the "specific" disease itself was an "entity," it was personified. To have done away with this conception is one of the great services of Lotze and Virchow, who recognised more clearly than their predecessors that disease, as well as normal life, is a process. A process, a mechanical or dynamical process, cannot, however, be a living entity; and hence Lotze and Virchow struck a fatal blow at the unscientific notion of a disease essence. Something in addition to their notion, however, dwelt in the conception of Sydenham, namely the observation that the "specific" disease must have a cause, although he did not separate sufficiently the conception of predisposition to disease from that of cause of disease. He recognised further that the character of the specific infectious disease varies greatly in different epidemics, and called this variation *genius epidemicus*, without remarking that the term expressed a fundamental departure from his conception of rigid disease types.

From the manifest opposition between Sydenham's conception of a "disease species" as an essence and Lotze, and Virchow's conception of disease as a process we are able at once to understand Virchow's direct and vigorous opposition to those bacteriologists who still stick fast in the fetters of ontology, and for whom disease-

producing bacteria are only mystical entities which they would like to set in the place of the older personifications of priestcraft to be worshipped by devout physicians and laity.

Virchow, following up the process of disease as far as possible, came at last upon the diseased cells. Here he too fell into a singular error. He set up the diseased cell as the essence of disease, thereby substituting another entity for the one he had just thrown down. It was a weak place in the cellular pathology and one against which Virchow's opponents were of course quick to set themselves, without, however, giving due consideration to one point in his theory, namely, that he did not lose sight of the disease process in his contemplation of the diseased cells as the microscopic disease entities. He rightly conjectured that the something that appeared as disease must be something that was already preformed in the normal organism. As the cause is essential to its effect, so the production of disease requires an inward predisposition. Lotze had already expressed himself in a similar way.

For the normal processes of life the same principle had been known for a long time through the investigations of the German physiologists Haller, Reil, and Johannes Müller. Whatever be the outside forces that act, the eye perceives only light, the ear only sound, the glands simply secrete, and the muscles contract. It is therefore the internal conditions of the organism, of its organs, tissues or cells, that alone determine the character of the effect. The impulse that must come from outside to produce these effects is called the stimulus. Hence there must exist fundamental internal organisation, that is to say, a predisposition to something external. Since also, while the character of the stimulus varies, the physiological manifestations remain the same, the true cause of the manifestations must lie in this internal organisation. The intrinsic predisposition is physiologically the true and sufficient cause, and therefore the sole cause of the normal processes of life. On this point Virchow indeed recognised, in agreement with Brown, that a quantitative excess in the normal life stimulus is the cause of disease; too much light, for example, produces blindness. The effect of a stimulus may likewise be too great if the natural predisposition

be feeble, although the stimulus itself is still within physiological limits for a normal organism. Disease, then, may be regarded as the result produced by quantitative changes in normal conditions, either when the physiological organisation is too feeble or the stimulus too intense. Apparently, at least, infectious diseases which were presumed to be entirely new qualitatively scarcely fitted into this conception. The doctrine of the causation of infectious diseases is accordingly not indebted to Virchow for its furtherance nearly so much as are other realms of pathology.

On the other side, those investigators who were dissatisfied with Virchow's explanation fell into the opposite error in their own investigations. The Viennese doctor Plenciz had expounded very clearly and more fully than any one had done before him the doctrine, that the cause of disease must be sought in the existence and activities of minute specific living things. Afterwards Eisenmann and still more acutely Henle set forth this parasitic theory of infectious diseases, which grew then steadily stronger through important discoveries. In our own time, through the work of Davaine, Pasteur, Klebs, F. Cohn, J. Schröter, and Koch, it has become the prevailing theory. By the statement of this theory Henle was thrown into just as sharp opposition to Virchow as Koch has been recently, and at the time was forced by Virchow's want of consideration into other lines of activity, a fact that enables us to understand many personalities in current controversy. The now well-established parasitic theory of disease asserts that every "specific" infectious disease is caused by a "specifically" characteristic small living thing or microbe. Most of these microbes—but not all—belong to the group of bacteria. These bacteria, which are therefore wholly external entities, are, as Koch has set forth with great clearness, the sole true and sufficient cause of the infectious diseases. Differences in these diseases are due to differences in the small living things at the bottom of the process, in the disease-producing bacteria alone. In short, bacteria constitute the "entities" of infectious disease. According to the *theatrum diabolorum*, the view prevailed in the Middle Ages that "every sin is under the control of and operated by a particular devil"; at present each disease in

similar fashion has its own devil in the form of a specific bacillus. Beelzebub, the god of invisible evil flies, is peculiarly the protecting patron of the "specific" bacteriologists.

Between this conception—in respect to which the French daily press owns allegiance to Pasteur and the German to Koch—and the conception of Virchow, there exists a profound antagonism. It is the same conflict that prevailed between Liebig and Pasteur over the physiology of fermentation. Liebig sought the cause of fermentation, as Virchow did that of disease, in the internal constitution of the fermentable substances, while Pasteur conceived the cause to be the external and visible yeast-cells. This conflict of opinion is now still further complicated by Pettenkofer's theory that at least for certain diseases, such as typhoid fever and cholera, the determining cause or essence is to be found in the external conditions which vary according to time and place. Here we have put forth as the true and sufficient causes of epidemic disease three wholly dissimilar things, upheld by three different schools, and which are treated as "entities" or personifications. Virchow sees an internal cause in the diseased cells, his opponents see an external cause in the germs that bring about disease, and Pettenkofer sees a cause in the external conditions which play no particular rôle either in the eyes of Virchow or in those of Virchow's opponents. At the same time, however, it must be said that Virchow consistently attempts to break free from the personification idea and to arrive at the comprehension of processes.

I shall now attempt to show what is false in each of these conceptions and what is scientifically tenable, and in so doing I shall point out that all these investigators recognised a part of the truth, but that no one of them attained to a comprehension of the whole continuity of causes in the sense of modern exact science. I hope also to show that the existing antagonisms resolve themselves into a higher unity by means of which the solution of the problem becomes again surprisingly simple, a result quite common in cases where each such antagonistic principle is unduly inflated that it may redound to the glory of its school.

CAUSES AND THEIR IDENTITY AND EQUIVALENCE WITH EFFECTS.

While the modern investigator in the exact sciences holds the conception of cause and effect only in a unitary or monistic way, and while in epistemology there is a similar understanding of these terms, among the people at large the word cause connotes quite different meanings. Sometimes the word is used in the same sense as it is by the man of science; such a case is the recognition in reference to an explosion that the degree of destruction is dependent upon the kind and quantity of the explosive material. Sometimes, however, we characterise as the cause the spark or the electric current which precedes the explosion and evokes it. In the first case the cause is something internal and exactly concurrent with the effect, in the second case the cause is something external which neither qualitatively nor quantitatively stands in any sort of congruent relation with the effect. In order to eliminate this double sense of the word "cause" and to make an end of the confusion, a general agreement was reached in connexion with the discovery of the law of the conservation of energy by R. Mayer and his successors, and this has usually been conformed to in epistemology also.

If potential energy or the capacity for doing work is transformed into kinetic energy or actual work the two are equal in quantity. They pass over quantitatively into one another, and the work as effect accurately corresponds to and is measured by the capacity for work as cause. The true and sufficient cause of any effect is always something internal, something that follows from the kind and amount of the initial energy, from its quality and quantity alone and entirely. This is the conception of a cause,—*Ursache*—, an idea which the German language can express so exceedingly well while other languages must paraphrase it (in Latin, e. g., *causa prima* or *princeps*, to which the further definition *causa interna* and *vera* or *sufficiens* are necessary for completeness) in order to represent everything that the prefix *Ur* denotes to a German. It is the absolute thing "that exists behind all change and remains primordially the same" as Helmholtz expressed it. This alone we

now call cause,—*Ursache*,—both in the exact sciences and in epistemology, and we accept nothing but that conception as true and sufficient. Only what is provided for in the cause both in quality and quantity can appear as effect, and everything that appears as effect already exists in quality and quantity in the cause, that is in the internal organisation.

RESISTANCES AND EXTERNAL CONDITIONS.

In a strict sense causes may pass over of themselves, freely and spontaneously, into their effect, as when a thrown or lifted weight immediately falls. In practice, as a rule, this does not happen, since in order to render a definite work possible, we prevent the raised weight from immediately falling again by hanging it up by a cord or by placing a support under it. Such a resistance to the immediate conversion of potential energy into work may be removed in a given case easily or with difficulty, and a corresponding application of external energy is necessary in order to do away with the resistance and so bring about the actual fall of the weight just at the right moment. This resistance, as compared with the actual conversion of the capacity for work into work, is in itself something purely adventitious; the conversion comes about now easily, now with difficulty, now in this way, now in that, according to the given external conditions. When uncertainty existed about the connexion, therefore, the expression "occasional causes" used to be employed. Such modifying conditions are not necessary to the effect, they have not in themselves the character of true causes but they are practically important. Corresponding to every form of potential energy there exist by virtue of the external conditions, definite initial circumstances and kinds of resistance which determine whether a given form of potential energy, a given possibility of work, a given internal cause can be converted easily or with difficulty or not at all into kinetic energy, into work, into effect. So long therefore as the external conditions remain the same, the same form of potential energy must be convertible with the same ease into kinetic energy, the cause into the effect. If the conditions change then the transformation may take place more easily or with more difficulty or not

at all, since by altering the conditions the nature and amount of the resistance may be changed. This quantitative conception of conditions was first set forth by me at the Naturalists' Meeting in Nuremberg in 1893, and Mach at the same time showed that the constancy of conditions is full of significance likewise for the constancy of physical processes.

THE LIBERATION OF ENERGY.

If the conversion of cause into effect, of potential energy into kinetic energy is prevented by any sort of resistance, such conversion can obviously take place only if this resistance is removed. This process may be called, with R. Mayer, the liberation of energy, and the external forces which accomplish this are called liberating impulses. I have shown that we cannot content ourselves with neglecting these liberating impulses as of minimal amount, but that they are connected in a definite and quantitative way with the liberation of energy; the impulse must always introduce energy enough to overcome the resistance.

All changes of one form of energy into another are visible or invisible movements, and the impulses that set free the energy are likewise transmissions of a movement. Because of the continuity of energy, therefore, every form of liberated energy acts by the transmission of movement so as to set free other forms of energy. In the processes of disease external signs of this process are afforded in the succession of changing symptoms. The impulses that set free energy are something external, and under certain conditions may be altogether lacking; it is therefore at least redundant to speak of liberating causes.

We now know of course that small causes produce not great, but only small effects, whereas small impulses, when of sufficient power to overcome resistances, may set free great effects. The effect is always a process, not an essence, and the causes which alone produce the effect are internal. External conditions and external impulses are always links of unequal value in an endless chain in which a movement exists. Breaking the chain at any one point makes the production of the effect impossible.

It is in itself a matter of complete indifference what notation one adopts. I have myself decided upon a definite and unambiguous terminology and thus reached clear-cut and definite conceptions. Such a terminology is applicable in all realms of human science, and therefore makes an end once for all of the loose terminology which has been in vogue in medicine. When I presented this view at the Naturalists' Meeting in 1893, the objection was made from various sources that, in view of the slightness of the theoretical knowledge and scientific training possessed by the majority of physicians, my exposition was somewhat too recondite. I have tried to succeed now in making it sufficiently clear that in the exact sciences there is absolutely no place for the toys of ontology, for entities or for essences, but that we must deal with dynamic phenomena, with processes which interlock with one another. That, I trust, is the plain sense of my detailed exposition.

I now hope also to show in a way intelligible to my readers that even in the organic kingdom and especially as regards the doctrine of the origination of infectious disease we have no place for the "entities" of Sydenham's "specific disease," or of Virchow's diseased cells, or of Pettenkofer's determining circumstances of time and place, or of Pasteur's, Klebs's, F. Cohn's, and Koch's "specific" disease-producing bacteria. I hope further to show that, in considering the origination of infectious disease and the dynamic processes which are concerned, we can take account of all these things without degenerating into the mysticism of ontology. Although Behring rates it as one of Koch's services that he established the entity of disease by setting forth the bacteria as the specific cause, yet it is clear that in adopting such a conception scientific medicine would take a long step backwards. In such a confusing state of affairs a clear and unambiguous terminology has always been an advantage. This, however, some of my opponents who are adherents of the bacteriological ontology, did not seem to appreciate, because it is advantageous for this exploded theory to have a vague, ambiguous nomenclature. This is plainly in order that the advocates may be able to say, after each newly-won position of science, that they had always really meant something quite

different from what every reader of their works had previously supposed them to mean.

ATOMIC COMBINATIONS AND RESISTANCES.

When organic substances are built up out of the elements or out of very simple compounds, there always results as the product of such a synthesis not only an increased number of atoms in the molecule but an increased number of combinations of atoms. But the individual atoms are more firmly bound to one another in the very simple molecules that serve as a starting-point than they are in the complicated synthetic products. Carbonic acid and water, out of which starch and sugar are formed in plants, are simple molecules and the atoms in the molecule are firmly united as compared with the more complicated and more unstable molecules of starch and sugar formed out of the same atoms. Carbonic acid, water, sulphuretted hydrogen, ammonia, and nitric acid, all of which may enter into the synthesis of proteid are very simple, stable atomic compounds compared with the loose and complicated combinations in which these same atoms are bound in the proteid molecules. Along with an increase in the number of atoms in the molecule not only the number of atom-groupings increases, but generally also the looseness of combination. Conversely also, if a complicated and unstable molecule be broken down and fall to pieces into simpler and more stable compounds, the ease with which the breaking-down is accomplished and the number of possible new combinations must be in general dependent upon the complexity of the demolished molecule. In a molecule built up out of simple compounds there exists just as much energy or internal cause as has been expended in its construction. The manner, also, in which the atoms are grouped or bound together produces a definite resistance which may be overcome with more or less difficulty.

In these cases, therefore, the resistance bears a much closer relation to the store of potential energy than in most cases in inorganic nature; it is a direct consequence of the process of construction and therefore a property of the molecular structure. In the

structure and constitution of an organic body the total amount of energy which may manifest itself as effect exists as the potential energy of combination, as the internal cause. The kind of energy is prefigured also in the molecular structure, and so, finally, is the kind and amount of resistance which prevents the immediate and free transformation of cause into effect. I have explained the latter phenomenon briefly, as it is unnecessary to consider details in this place. The looser and more manifold the atom-grouping of a molecule is, the more energy the molecule contains; so much the less also is the energy needed to overcome the resistance and liberate the energy of the molecule, and so many more are the different kinds of external impulses which are able, by the application of anisochronous movements, to overcome the resistance, to convert the potential energy into kinetic, the cause into effect.

In purely inorganic processes the liberating impulses either bring about an effect or do not bring it about according to the extent to which they are quantitatively adapted for the removal of resistance. This property of the liberating impulses bears a relation to the quality of the potential energy set free only through the particular form of motion involved. In the liberation of the energy of complex organic molecules, on the other hand, the impulses bear more of a qualitative relation. But whether they can or cannot make themselves felt in such a qualitative way again depends in the last instance exclusively upon the character of the molecular structure. The nature and amount of resistance depend also upon the structure, that is to say, upon the internal organisation of the organic substance upon which a liberating impulse impinges. Resistance is therefore in plain terms a result of adaptation, while in the inorganic realm it often results from the simple juxtaposition of different processes and their reciprocal action.

Accordingly, in our inquiry into the causes of organic processes we meet everything that we find in inorganic processes but better regulated and more intricate, in the first place by means of adaptation, and secondly, because of the complexity of the phenomena. We find various forms of potential energy or internal causes which may be transformed into kinetic energy, into work or

into effect. The effect, so far as its special features are concerned, depends solely upon the qualitative character of the compound, that is to say, the mode of union of the atoms in the molecule. This qualitative relation is more striking in the realm of the organic than in the inorganic, where it has been recognised from R. Mayer to Hertz that the qualitative relations may be overridden. At bottom, however, exactly the same subjective limits wall us in, although that is a fact that need not be dwelt upon here. Every quality is of course from one point of view a sort of sense-illusion or sense-limit, and not anything truly objective. We find forms of resistance, then, which result from characteristics of structure and therefore present not only the well-known quantitative but also a qualitative side worthy of consideration.

Finally we need to consider the liberating impulses which quantitatively and qualitatively serve to remove the resistance. We now depict the problem in a somewhat different way, because in the historical development of the subject the aspect of quality so predominated that the quantitative side was wholly overlooked or not recognised, and only Liebig, Lotze, Virchow, and Nägeli suspected the existence and partly recognised single factors of this kind.

The fact that a long time elapsed before, in the natural sciences, the dualistic contrast between organic and inorganic was abandoned is connected with the fact that the conceptions of the *Critique* so long lingered in men's minds. Kant was a dualist, and for him inorganic processes were the consequences of necessity; organic processes, of purposiveness. Schopenhauer found quantities in inorganic processes, qualities or stimuli in organic. Unfortunately dualism in the latter form still haunts the minds of many physicians who often never suspect its retrogressive character as compared with the mechanical and monistic point of view.

PREDISPOSITION TO DISEASE ACQUIRED AND INHERITED.

As the result of inheritance, individual development, and adaptation to existing conditions of life, every man,—and man is the subject I place from now on in the foreground,—possesses in his entire

organism, in his organs, tissues, cells, and body-fluids, at a given time and place, a definite kind and amount of potential energy or cause. This, when it becomes manifest, we designate variously as a physiological property or irritability, as a morbid susceptibility, as a predisposition to disease or as immunity. A predisposition to certain diseases exists among different races and species. Negroes for example are infected with smallpox much more easily than Europeans, while the latter sicken more easily with yellow-fever and the disease assumes in them a more fatal character. A varying susceptibility to disease is found among individuals of the same species, as is established by the fact that among our population only 3 to 7 per cent. contract cholera, the rest of the population resisting the disease. In spite of the ample opportunities of infection with tuberculosis which are afforded every one, only some 20 to 25 per cent. of the population really contract any form of the disease. Indeed, if we consider the most dreaded of all known infectious diseases, the Black Death of the Middle Ages, we are told that only one fourth of the whole population of Europe contracted the disease, some 75 per cent., therefore, being naturally protected, while it is reported that the small-pox in Central America destroyed one-half of the native inhabitants.

That the different organs of the body possess a varying predisposition to disease may be inferred from the fact that diseases which are now known to be infectious were once regarded as organic, as, for instance, inflammation of the lungs and catarrh of the intestine. The striking differences shown in the organs attacked by tuberculosis, and the selection of different organs at different periods of life beautifully illustrates this point. The experience of physicians and the vast material placed at our disposal in statistics of disease and death have, in short, shown the existence of a predisposition to disease and have made it clear that susceptibility to different diseases varies greatly according to the period of life and again according to sex.

Plant parasites furnish some fine examples of predisposition. *Laboulbenia muscæ* is found only in the house-fly. *Cordyceps*, on the other hand, occurs in the larvæ of different butterflies and other

insects. *Phytophtora infestans* occurs only upon potatoes, while *Phytophtora omnivora* attacks a number of other plants but not potatoes. Species of moulds of the genera *Pythium* and *Sclerotinia* attack only plants that are young and rich in water and therefore less resistant, but do not attack the older plants which are less rich in water. *Cystopus candidus*, according to De Bary, causes the white rust of the garden-cress (*Lepidium sativum*); in fact all plants are susceptible to the attack of this fungus, but only when they are in the cotyledon stage; when the cotyledon falls off the leaf becomes resistant and the spores and germ-tubes of *Cystopus* penetrate only locally in every case, without being able to penetrate far into the interior. The blister-rust of spruce needles occurs according to Cramer in its other parasitic forms only upon the leaves of the Alpine-rose and wild rosemary, *Chrysomyxa rhododendri* and *ledi*. In localities where these two plants do not occur no blister-rust is found upon the spruce. Similar relations exist, according to De Bary, between the rust of wheat and the Aecidia of the barberry. The "local" disposition is therefore, in reality, a disposition of the host. According to De Bary, if the disease predisposition due to the host be removed—e. g., if the barberry bush be banished to a distance—the disease disappears, and again arises when susceptible host-plants are introduced.

Perhaps the most remarkable fact in this connexion is that very definite predispositions may be acquired. An attack of the affections due to "catching cold" or of rheumatism—affections causally related perhaps—increases the tendency to those diseases, while an attack of any one of the more acute infectious diseases, such as smallpox, scarlet fever, or measles, confers immunity against another attack. Susceptibility to disease has become protection against it. Such an individually acquired immunity can be transmitted from mother to child. I shall not in this place broach the much mooted question, whether or not acquired characters can be inherited, and shall not try to set forth here how, upon the basis of my representation of the problem of causation, the question really comes within our reach. It may suffice at present to make clear that, under certain circumstances acquired characters, among which

may be reckoned acquired tendency to disease or acquired immunity, must be inherited. According to Kaltenbach, twin-sisters, originating from two different ova—double placenta from two chorria—were exposed in equal measure to infection from scarlet fever: one of them remained entirely immune, the other succumbed immediately. The latter resembled the father, the immune child the mother, who, fourteen months previously had experienced a severe attack of scarlet fever. Here was a pronounced inborn quality, but this quality was inherited and the character thus transmitted was acquired by disease. An interesting observation has been made in certain cases of twins and triplets. When, by infection of the mother with smallpox opportunity was given for placental, intrauterine infection of all the offspring, one or another of the children remained free from the disease, and the possibility of infection taking place by means of the placenta was proved by its occurrence in the case of one or more of the children. But it has also been observed that a pregnant woman who had been successfully vaccinated gave birth to a healthy child who nevertheless sickened three years later with smallpox, and in another case that smallpox was observed in a fœtus whose mother had previously suffered with the disease. Whether an acquired disposition is transmissible depends upon the kind and duration of the influence. On this point it is easy to deceive oneself. In Ehrlich's experiments upon rendering animals resistant to poisons, at first sight it seemed as if the young inherited immunity; another interpretation proved, however, to be the true one. The young of a non-resistant mother, when fed on the milk of an immunised mother, acquired immunity, thereby showing that the immunity was not conferred by inheritance. It was instead an instance of extra-uterine, individual immunisation by means of the protective substances contained in the milk of an immune mother or nurse. According to Tizzoni, however, immunity to tetanus acquired by the father can be transmitted to the offspring.

The existence of a definite predisposition to disease—as well as its opposite—is dependent upon inherited traits and upon adaptation to the conditions of existence, among which may be num-

bered not only soil, water, air, and the general relation of weather and climate, but also social conditions. These changing circumstances or external conditions act upon the internal disposition which remains always the same. If these conditions change, then adjustment must occur, that is, changes in the internal constitution must take place. Every change in locality, every considerable change in nutrition may, therefore, make itself felt upon our predisposition. By utilising the information gained from experiments in this line we have a means of influencing the disposition in our favor, or, for instance, by removal of social mal-adjustments, by improvement of the locality in which we dwell by changes in metabolism through introduction of better nutriment, or by regulating the temperature conditions of the body. Finally we are able to make use of the fact that in the act of undergoing a disease the predisposition to that disease is removed and converted into its opposite, immunity.

In no case can anything appear in the form of disease which was not previously present in the body as a predisposition; external forces are able merely to make this predisposition apparent. It is therefore at the outset important to hold fast to the fact that we are in a position to act upon a given disposition by a whole series of changes in external conditions; we can heighten it or remove it. Herein lies also the reconciliation of the physician's art, which has reference to the individual, with the official health regulations, which have regard to the conditions making for the betterment of all. When the physician, by thorough observation and investigation, knows the conditions that influence a given disposition in a definite way, when he is scientifically trained and has a true conception of hygiene and is at once physician and naturalist, then he is able to cure disease by use of the very same forces which serve to create or alter the human constitution. In this simple sense there is a true art of healing.

The external conditions to which a human being is subjected according to season and locality make themselves felt throughout the organs, tissues, and cells of the whole body. This they do through the mediation of metabolism and by the aid of the nervous

system, factors that determine the character of the synthesis or the building up of the organism, and as before mentioned, that determine also the kind and amount of the resistances to release of energy. We are accordingly set the further task of guiding the course of events by the use of those conditions that create resistances, and guiding them further in such a way that the physiological resistances are easily overcome, and the liberation of energy follows easily and in normal paths, while pathological resistances are avoided and the pathological setting-free of energy cannot result. Since the kind and amount of resistance met with in the organic kingdom is a consequence of organic structure, this task practically coincides with the first, namely that of influencing with the help of suitable external conditions the potential energy, the cause, in a word, the disposition of men.

DISEASE-STIMULI AND DISEASE-EXCITANTS.

The liberating impulses, as they are called in the inorganic sciences, are called stimuli in speaking of normal life-processes. Liebig, in treating of fermentation processes, first used the term excitation, so that we may speak of the stimuli that evoke disease as excitants of disease.

Through a depression of the physiological organisation and a consequent lowering of resistance, normal physiological stimuli may become disease stimuli, or, the organisation and resistance remaining the same, the normal stimulus may become more intense and be converted into a disease stimulus; in other words, the stimulus may come into play only quantitatively. If this be so, it is easy to understand how the kind of effect which we call disease depends qualitatively upon the kind of organ, tissue, or cell concerned, and indeed solely upon these and their internal adjustments (Virchow). If the disease stimulus, however, is a living thing, then, according to Koch's conception, the natural law should be summarily abolished and the quality of the disease stimulus, namely, the kind of disease-producing bacteria, should determine the disease, in other words, bring about the effect. We get only apparent support for this view from such facts as that anthrax bac-

teria always evoke anthrax, and tubercle bacilli tuberculosis in susceptible animals, and that many diseases, such as malaria and pneumonia, have a typical and often cyclical course. If the facts are considered attentively, they reveal a state of affairs really quite different. If we suppose that the pathogenic bacteria are "specific entities," that they are really the true and sufficient cause of disease as Pasteur and Koch have affirmed, then at least four conditions would have to be fulfilled. First, the disease-producing bacteria should exert no other effect than that of producing disease; second, their ability to produce disease should remain constant; third, they should affect all animals in the same way without reference to particular species; and fourth, they should produce only a single, sharply defined, typical and "specific" infectious disease. In such a way as this Koch has really pictured things to himself,—this is indeed the leading motive of his school,—while Pasteur who also originally looked upon the question in the same way, later adopted other opinions. The dogma of the "specificity" of the minute organisms that excite disease, the belief in the existence of pathogenetic or pathogenic bacteria, meaning thereby belief in unvarying specific character and physiological effect, was especially developed by Henle and later was worked out by Davaine, Pasteur, J. Schröter, F. Cohn, Klebs, and Koch. Other investigators, among whom I need name only Nägeli and Billroth as the leaders, have believed, in opposition to this view, that bacteria are constant neither in kind nor in action.

Now in the first place, are disease-producing bacteria capable of producing any other effect? By the modern method of pure cultures it has been established beyond all doubt that disease-producing bacteria do indeed display other activities; the successful culture of pathogenic bacteria is in itself a proof that those bacteria are not restricted to a parasitic existence and to the exciting of disease. Thus for example the bacteria of glanders develop a brown pigment upon potato; the cholera bacteria form a yellow or brown pigment upon potato, and in sugar solutions cause an acid fermentation; the so-called golden pus cocci, which are the most common pyogenic bacteria, form in cultures a splendid yellow pigment and

in sugar solutions produce acid. Whereas formerly, in accordance with F. Cohn's view, bacteria were distinguished according to their "specific" activities and characters into disease-producing or pathogenic, fermentation-causing or zymogenic, and pigment-forming or chromogenic, the foregoing examples show that a single bacterial species, a single "specific" minute living thing is capable of exercising all three of the specific activities formerly held to be essentially distinct. The "specific" bacteria are therefore not the true cause; that lies in the character of the nutrient medium; the bacteria can elicit only what is preformed in the structure of the medium. I have given the name of "cycle of activity" to this class of phenomena. They plainly militate against the doctrine of "specific" disease germs held by Cohn and Koch, and they help us to understand one important thing concerning the production of disease, namely that it is not the transferable "essence" that determines the character of the "specificity" of disease, but the similarity and the permanency of the conditions of life. Since disease germs, presumably "specific," are able also to cause fermentations and to form pigments, it is clear that a close relation exists between the "parasitic" bacteria occurring in living human beings and the so-called "saprophytic" bacteria, the bacteria of putrefaction, which are able to live outside of the human body upon dead, lifeless, organic or inorganic material. Such relations are sometimes very easily traced, but are often obscure and in other cases are wanting. The parasitic organisms may accordingly be separated into obligatory parasites, facultative saprophytes, and facultative parasites.

In the first class the relations to processes of putrefaction, and the ability to live at the cost and by the destruction of lifeless food material, have gradually been completely lost, or at least such relations have up to the present not been made out. In this group may belong perhaps the yet undiscovered germs of the so-called acute exanthemata like smallpox, scarlet fever and measles, and also the germ already discovered, in relapsing fever. The facultative saprophytes are those germs that we find as a rule living as parasites, but which, under special conditions, maintain themselves also

upon lifeless material, and by breaking down this lifeless nutrient substance are able to grow, multiply and perpetuate the species. The saprophytic condition has been brought about in the case of the tubercle bacillus by Koch and by Fischel, one of my pupils, and I was able to show that this organism, which up to that time had been called tubercle bacillus, is only a parasitic form of a pleomorphic microbe, the other forms of which make their appearance only in the course of its saprophytic existence and were hence entirely overlooked at first. The group of facultative parasites comprises those species which can maintain and reproduce themselves in a purely saprophytic way upon lifeless material without ever necessarily attacking living hosts as parasites; indeed to attain certain stages of development it is necessary that they should live the life of real saprophytes. To this group belong the majority of the disease-producing bacteria now known, such as the bacteria of anthrax, typhoid fever, and cholera.

Finally there are bacteria which in a strict sense never invade the living organism, but yet are dangerous and able to provoke disease. Many of the bacteria of putrefaction are able to generate out of lifeless nutrient substances poisons that act injuriously on human beings without the poison-forming bacteria themselves being directly involved. This may happen in the normal organism in intestinal putrefaction, a process which seems in itself to have become necessary as a result of adaptation. Such bacteria may be designated as œco parasites, and may be regarded as transition forms to the facultative parasites. The organism may also be affected through the removal of protective structures of the body by the action of putrefactive poisons, for example, the intestinal epithelium may be killed; these saprophytes may then enter into the dead tissues, and may even penetrate still farther into the body as for instance into the nearest lymph glands. The common bacterium of the large intestine, *B. coli communis*, can do this. There are found, furthermore, transition forms between the different groups of parasitic microbes, so that it is evident that we are not here dealing with rigid groups, but only with a division which enables us to

recognise more easily the characters important from a human standpoint.

In the process of putrefaction, a process which forms an absolutely necessary link in the cyclical course of matter, are found represented the fundamental phenomena of parasitism out of which by development and adaptation to living hosts the various stages of parasitism have arisen. Putrefaction may exert in other respects an important influence upon the excitation of disease; volatile or soluble poisons of putrefaction may weaken the living organism so that it can be attacked more easily and successfully by the true parasites or by their toxins. The simple vegetation of certain saprophytes acts in such a way that disease germs following in their wake can get lodgment upon man the more readily, while on the other hand other saprophytes may hinder the lodgment of pathogenic organisms. Among the various possible effects thus wrought by saprophytic microbes outside and inside a living host must be included those that either favor or hinder the lodgment and action of the disease germs. That is to say these microbes act upon the disposition towards disease. They present therefore only individual cases, albeit particularly difficult to estimate, of external relations or of conditions which may now exalt an existing disposition to disease, now diminish it or remove it altogether.

This explanation should make it no longer difficult for the reader to understand the very various modes of action of disease-germs in man, since these possibilities of action have developed out of two activities already manifested in the process of putrefaction, namely out of the formation of poisons by bacteria, and out of bacterial growth and multiplication. At one extreme, therefore, we find a kind of parasitic action in which not the bacteria themselves but the poisons formed by them and absorbed into the circulation are the more important factors, while upon the other side stand those parasites which act especially through the formation of local growths or tumors. To the latter class belong the germs causing tumors which have been investigated with especial accuracy among plants, and a well-known example of which is the germ of human tuberculosis; to the former belong the germs of diphthe-

ria and tetanus; cholera also approximates to the former group. Between these extremes stand the other pathogenic bacteria: in some the proliferation of the bacteria, in others their production of poison is the predominant factor. Disease producing bacteria may therefore affect man in very different ways. By growing and multiplying in vital organs they may cause changes, and by thus altering the metabolism of important organs may influence unfavorably the metabolism of the whole body; or they may rob the body of important nutrient material and introduce the products of their own metabolism into the body of their host; or they may, in the act of satisfying their own need of energy, split off from the proteids of the human body certain substances which act upon man as poisons; or they may themselves generate poisons in their own bodies and like poisonous plants, be in themselves poisonous. The mode of action may vary according to conditions; for example, ergot is a local growth for the grain, a poison for man.

In all cases, from the simple germs of putrefaction and the œco-parasites up to the obligatory parasites, one thing is a prerequisite to successful invasion, namely, that as compared with the mechanical or chemical attacking powers of the microbe the mechanical and chemical resisting powers of man be relatively feeble or impaired. If this is not the case the human organism either does not allow the germ to gain entrance to the body, or when entrance is effected it nullifies the poisonous action by a counteraction.

After what has now been stated no particular assurance is necessary that bacteria and other minute pathogenic organisms do not exercise their injurious effect upon man from an inbred wickedness and pleasure in doing mischief, but that in the phenomena of parasitism we have to do simply with questions of adaptation, with the utilisation of situations, so to speak, which man himself provides by his own sins of hygienic omission and commission, and which therefore he himself is able to remove. The germs of putrefaction dispose of the dead bodies of all organisms in nature, simply to satisfy their own need of energy and the conditions of their own metabolism. This is also the case when they adapt themselves

to the conditions of intestinal putrefaction. They may for the same reason invade the living organism whenever its normal protecting power has become enfeebled through errors in hygiene.

The second question is, Do the so-called "specific" disease germs vary in their capacity to produce disease? Buchner was the first to succeed, upon the basis of systematic experiments, in proving that the so-called anthrax bacilli can be influenced artificially in such a way that they can no longer bring about any illness, but behave like perfectly harmless saprophytes. The same discovery was soon afterwards made accidentally by Pasteur in regard to the bacteria of so-called chicken cholera, and we now know from hundreds of experiments that no peculiarity of disease-producing bacteria is more easily affected than the very capacity in question, commonly presumed to be "specific," of producing disease. The physician who seeks the "essence" of the disease in the "specificity" of the disease germs can plainly attach importance only to those parasites whose "specific" capacity of producing disease is invariable. The facts that demonstrate the variability of this capacity therefore obviate all need for seeking an "essence."

The third question is this: Do the same "specific" disease germs affect all animals with the same typical disease? This question must also be answered in the negative. We see that each kind of disease germ affects only certain hosts; syphilis, leprosy, cholera, and typhoid fever, are known only in man, while tuberculosis, glanders, and anthrax, attack both man and certain kinds of animals.

The fourth question is whether a "specific" disease germ causes only one disease. We may distinguish in this inquiry two groups of phenomena. In the first group belong those facts showing that similar symptoms may be evoked and that the same organs or tissues may suffer anatomically similar changes through the action of entirely different germs. For example, the formation of nodules or tubercles in connective tissue may be brought about by the germs of syphilis, leprosy, glanders, and tuberculosis; suppuration can be caused by the germs of wound erysipelas, the tubercle bacilli, the anthrax bacilli, and the germs of typhoid fever and

pneumonia; both the common bacteria of the colon and the cholera bacteria can incite diarrhœa; the bacteria of tuberculosis, of typhoid fever and pneumonia may produce inflammation of the pia mater; tubercle, typhoid, and pneumonia bacteria, gonococci, staphylococci, and streptococci, may cause endocarditis; the phenomena of blood-poisoning are caused by a whole series of bacteria. In these cases, therefore, the determining cause resides in the tissues and their disposition, not in the entirely distinct kinds of bacteria.

The second group of facts, belonging with these but obtained in another way, demonstrate that one and the same "specific" disease germ may produce very different affections. Diphtheria bacteria, for example, may occasion local diphtheria or paralysis or acute blood-poisoning; the bacteria of erysipelas may bring about erysipelas in the skin, but are able also to produce suppuration or inflammation of the lungs; the pneumonia germs may cause typical pneumonia, blood-poisoning, inflammation of the cerebral membranes, or inflammation and suppuration of the middle ear; tubercle bacilli excite tubercle formation in connective tissue, inflammation of the cerebral membranes, suppuration and true consumption or phthisis.

Perhaps still a third group might be added, comprising the critical diseases like intermittent fever, relapsing fever and pneumonia. Many observers suppose, in accord with Henle, that the germs of these diseases in man have a course of development sharply defined by hours or days, and that therefore the life-cycle of the germ determines the cycle of the disease. So far, however, as we know anything about these germs, we never find such remarkable cycles occurring outside of the human body. The pneumonia germs cause crises only in man, while in rabbits they bring about simple blood-poisoning without any cycle. In cultures they show no regular cyclical character at all. For these reasons I am inclined to seek the basis of such activity of a cyclical nature in peculiarities of the human organisation, and the more so that even in man pneumonia may sometimes occur without crisis and show a resemblance to forms of blood-poisoning.

Upon sifting all the available material, I cannot find a fact which is in real harmony with Koch's conception of "specific" disease-germs. I must protest also against the view held by Billroth and Naegeli, which is extreme and one-sided and I expressly acknowledge that we can distinguish species and genera among bacteria and other minute organisms. Such constancy as we observe, however, is not the mystical constancy of "specific" essences, but a constancy made possible by the permanence of the environment. The organisms change with the changes in their surroundings, and the placing of this fact on a sure footing constitutes the great advance that modern bacteriology has made beyond the standpoint reached by Koch.

Just as the human being possessed of a definite organisation is compelled continually to adapt himself to changing conditions of life, so is the microbe also constrained to the same task. In the majority of men the bodily constitution is always oscillating, manifesting now increase, now decrease of a definite disposition toward disease. The microbes also vary according to the conditions imposed upon them and display increased or decreased capacity to grow or form poisons in the human body, capacity in other words to remove with greater or less difficulty the resistance inherent in the human organisation. Accordingly we observe the occurrence of both mild and severe epidemics, and in every epidemic, along with the "typical" cases, we find especially grave or especially light cases which do not conform to the schema.

If we diminish the disposition of a man toward a disease we influence his organisation in the sense of exalting its resistance to infection. In this way the same effect is produced as when we diminish the "contagious" or toxic quality of the disease germ, the disposition of the man to the disease remaining the same. The ordinary anthrax bacteria, for example, cause in guinea-pigs a generalised blood-poisoning which is speedily fatal, and in dogs, which are naturally immune towards this disease they cause at most an abscess, or a local suppuration. But if we diminish to a certain extent the disease-producing power of the anthrax bacilli, they pro-

voke in the otherwise very susceptible guinea-pig merely a local suppuration which readily heals.

The disease germs remaining the same, it is possible to heighten natural predisposition to disease by starving animals, or chilling them, or modifying their metabolism unfavorably by inducing artificial diabetes. In such cases animals succumb to the very disease germs against which when in a normal healthy condition they are immune. We know also that through hunger, insufficient nutriment, and disorders of metabolism such as diabetes, human beings are rendered more easily susceptible to infection than when in a sound and normal condition. Before the days of antiseptics the "healthy skin" played an important part in the progress of a wound.

The "specific" qualities of disease germs, qualities which they possess as do all living things adapted or adapting themselves to definite conditions of life, can only become manifest in the shape of a specific infectious disease when the forms of motion which they impart in order to overcome the resistances arising from the organisation of the human body happen to accord with the possibilities of motion which occur in the structure of man as the result of inheritance and adaptation. Only in this way is it possible to account for the fact that—as has been proved concerning some moulds—micro-organisms which, so far as we know, occur only as saprophytes upon dead material are able to produce disease when for the first time,—thus excluding any possibility of an adaptation,—they are artificially inoculated into susceptible animals.

If the facts are considered in a scientific spirit, rigorously and without prepossession, it is seen that the sum of the qualities of a disease germ is only apparently the "essence" of an infectious disease, that in reality, here as elsewere, a true internal cause is to be found, inherent in the internal organisation of man. Just as in all natural processes without exception, so here the disease germs act as liberating impulses and are able to set free only what in the form of a predisposition toward disease is in some way prefigured both in nature and amount in the human body.

The dependence of both resistance and disposition to disease

upon the conditions of life, as well as a like dependence of the disease germs upon their conditions of existence—inasmuch as they likewise are living organisms—explains, without recourse to violent assumptions, such facts as that insignificant local infectious diseases may become world-wide, as cholera has done in our own century, that new infectious diseases may make their appearance, as for instance cerebro-spinal meningitis in the last hundred years, and that diseases once widely spread like leprosy and the bubonic plague may dwindle almost to the vanishing-point. We can easily understand the fact also that everywhere, even under conditions originally very different, similar cultural influences arising from similar unsanitary social conditions lead everywhere to the same danger from diseases such as tuberculosis, for the reason that such conditions create a larger number of the same or similar dispositions towards disease.

That the "specificity" of the disease germs is a phenomenon of adaptation, and hence not an essence is manifest also from the fact that the parasites adapt themselves to given conditions of life not only in their mode of action but in their form. Koch has shown that the anthrax bacteria develop their characteristic form of rods only in their parasitic phase. The tubercle bacilli have such a strongly marked capacity of adaptation that Maffucci and Koch even distinguished as separate species or varieties the germs of mammalian tuberculosis. Fischel and Hueppe, however, by the choice of suitable parasitic and saprophytic conditions of life succeeded in converting the two kinds one into the other, and thus in proving that it is similarity or difference in conditions which ultimately brings about such great divergence.

Finally, in other cases of which more accurate studies were made long since, especially among the higher animal and plant parasites, a close adaptation to the conditions of life is manifested in the fact that a parasite, in order to complete its development, needs not only an interchange of parasitic and saprophytic modes of life, like the facultative parasites among bacteria, but requires a complete and more or less extensive alteration of generations. Such a parasite, in other words, attacks different animals and plants one

after another, in each of which it passes through a definite stage of development.

Among most parasites there occurs a free or saprophytic stage which is advantageous to the maintenance of the species. In such a case the parasite is often autœcious, that is, no change of host occurs. In alternation of generations there is always change of host or heterœcism, so that in the extreme cases of strongly obligatory parasitism this occurs in a fashion as if saprophytism were altogether omitted. In the tape-worm, for example, we know no free stage; the eggs pass into the outer world but do not develop (at least up to the present nothing of the sort is known). The scolex of *Tænia solium* is found in hogs, the tape-worm in man; the scolex of *Tænia mediocanellata* is found in cattle, the tape-worm belonging to it in man; the Echinococci are found in man, the respective tape-worm in dogs. The scolex of *Bothriocephalus latus* is found in predaceous fishes, and the tape-worm in man, but free living embryos arise from the eggs in water. In this latter case, therefore, a limited free stage does occur. In *Distomum hepaticum* three parasitic and two free stages are known.

We know that among the rusts or Uredineæ there occur upon grain summer spores or uredospores (stylospores) and winter spores or teleutospores; out of the latter are formed saprophytically in the fallen leaves a promycelium which develops sporidia; these get lodgment upon the barberry leaf in which the æcidia develop and form besides spermogonia, the so-called spermatia. We have therefore three to four parasitic forms and one free form. Among the smuts or Ustilagineæ the mycelium develops spore-bearing filaments upon the grain; out of these spores a promycelium with spiridia is formed saprophytically; the sporidia may invade young plants and so begin again the parasitic cycle, but they are able also to vegetate saprophytically for countless generations in a torula form. Here two saprophytic forms and one parasitic form are able to exist. The spores of most vegetable parasites are able to develop either a saprophytic form or another parasitic form.

An alternation of generations of this kind has not yet been demonstrated among disease-producing bacteria and other microbes,

but with some species its existence is not wholly improbable. It is obvious that such complications increase the difficulty of research, already arduous, but the fundamental facts that have been discussed are not thereby affected or in any way altered. The body of living organisms offers relatively constant conditions, and that explains why, in spite of the complexity due to an alternation of generations in several hosts, the parasites can remain relatively the same.

INFECTION AND CONTAGION.

I cannot conclude my examination into the causes of infectious disease without referring to still another feature of the external conditions which may be very important practically. Granting the existence of a given disposition toward disease, disease germs can evidently afford opportunity for the manifestation of this disposition only when they come in contact with it. That is the broad meaning of the word infection. From this point of view, accordingly, the unsuitable condition of the general surroundings of life, such as air, water, soil, and nourishment, may be of importance by virtue of being the means by which the disease germ is first introduced into us. The quite various channels of the mouth, the lungs, and the skin are available for entrance. The organs affected in an infectious disease are sometimes in the place where the disease germ enters, sometimes in tissues remote but more disposed toward the disease; the expression *locus minimæ resistentiæ* is a designation used to denote their relation.

From this standpoint we classify those diseases as contagious which can be directly communicated by mere contact with the sick and do not need a go-between; and as miasmatic or non-contagious those which are not transmitted directly from the sick but are caused by external agents. In the great majority of infectious diseases both possibilities of communication exist; one or the other is the more usual merely. In this sense malaria is never naturally contagious, but may be artificially communicated by transfusion of blood; cholera is generally not contagious; small-pox is always contagious. The concept contagion is accordingly used in a nar-

rower sense than that of infection, and if we depart from this general usage we must always declare the fact and make it abundantly evident. I say this expressly because certain bacteriologists use the term contagion to express the same conception as that implied in the term infection or wound infection. If this is done in the face of usage, of the clinical experience of physicians and of the experience of every layman, then naturally all diseases must be called contagious, for the word used in this fashion loses completely its peculiar and narrower significance. By some such quibble, for example, Koch and certain of his followers are able to declare cholera to be a contagious disease, while medical experience as well as bacteriological experiments prove plainly that cholera as a rule is not in the strict sense a contagious disease.

FERDINAND HUEPPE.

PRAGUE.

THE UNMATERIALITY OF SOUL AND GOD.

IN REPLY TO THE CRITICISM OF THE HON. JUDGE CHARLES H. CHASE.

SCIENCE is frequently regarded as materialistic, while in fact it is as little materialistic as is religion.

The difficulty consists in the meaning of the word "materialism." The term is in its popular acceptance frequently used as denoting a view which would refuse to believe in ghosts and ghost-existences of any kind. Accordingly scientists, men like Helmholz, Kirchhoff, Huxley, Hertz, etc., who endeavor to explain all phenomena of motion from the laws of mechanics, would be gross materialists, and of course, in that sense, our greatest philosophers, the teachers of all schools, even the idealists Spinoza, Kant, Hegel, Schelling, Fichte, Schopenhauer, etc., etc., would have to be counted among the materialists. Materialism in its exact significance is different. According to the terminology current among philosophers, materialism is a world-conception which attempts to explain all phenomena from matter and motion. But there are a number of people who are so materialistic in their conceptions that they materialise even things immaterial, and with these ultra-materialists materialism is frequently a name of opprobrium. Whenever they speak of materialism they mean the very opposite of the exact meaning of the word. These people, Spiritualists and their ilk, regard the soul as a kind of substance, and any one who would not look upon spirit as a kind of attenuated matter is, in their terminology, called a materialist.

What is true of the term "materialism" is true also of the

term "atheism." Most outspoken atheists are outspoken materialists, but there are also theistic materialists who would regard as an atheist any one whose God is not a corporeal being, or at least an individual Creator with human sentiments and human volitions.

The difficulty at the bottom of all these problems consists in my opinion in the inability of a certain class of people to think of things immaterial as real and effective presences in the world without materialising them, without conceiving them after the fashion of substantial things or beings. Man is naturally a materialist. He naturally overestimates the importance of his sense-experience and is apt to think that matter and energy are the only realities that exist. But matter and energy are only two features of reality, both being abstractions of certain general qualities of existence, which correspond in our own existence to sensations and volitions. Matter is the sense-perceived, energy is resistance and that which overcomes resistance. But will-resisting energy and sense-perceived matter are by no means the only realities. In addition to matter and energy there is another class of important features met with in experience which we may call by a general term form. A clock does not consist of metal, be it gold or iron or steel or wood, but it consists first of all of a definite form and the form is exactly the thing which constitutes the clock. A little thought will soon teach us that form is by far a more important abstraction than either matter or motion. For under the general term of "form" fall all those most important qualities which condition the mentality, the rationality, and the ideal aspirations of man's soul.

There are a great number of people who undervalue the importance of form. Because form, in and by itself, is not something material, they imagine it does not exist and is of no consequence. But form does not only exist, it is not only a real factor in the actual world, but it is the most important factor of all.

A materialistic friend of mine, insisting on the all-importance of matter, declared that form was of no significance because things could not exist without matter, and if matter were taken away the whole thing would be gone. Therefore he argued that matter was the essential thing that constituted the reality of things. He

said that form is a quality of matter, that matter is the real thing, and matter possesses form, not form matter. But he forgot that matter is as much an abstraction as form. There is no matter which would be nothing but matter, and all matter has both definite shape and definite structure; for under the term "form" we comprise also the internal make-up of things.

Form is that which constitutes the thing in its particular individuality, and the laws of form are that something in the world which shapes the course of events and conditions natural phenomena. Form conditions the suchness of things, matter the thisness.

We are in the habit of regarding the material as first existing and as afterwards assuming shape. The artist takes a marble block and cuts the statue out of it, as, according to the first chapter of Genesis, God took a piece of clay and formed man. But would it not be more correct to say (as does Aristotle, for example) that a certain form was actualised by being imposed upon some kind of material? The artist has the image of the statue in his mind and this image, which since Plato's time is commonly called by the Greek word idea (from εἶδος, image) is a more or less clearly defined conception of some special form.

In the same way, or rather with more intrinsic necessity, the idea of man existed before he originated in the process of evolution. The mental organisation of a rational being is a special application of the universal laws of rationality, and thus the nature of man, as a rational being, is predetermined in the world's constitution since eternity.

The forms of things are relations which are determined by the intrinsic laws of forms, and the "ideas" of Plato are as significant as the laws of mathematics and logic. This seems clear enough, but my materialistic friend used to say that if you took away all matter and energy nothing whatever would be left, to which statement I must take exception. If you take away matter and energy there would be left, as an intrinsic reality from which neither existence nor non-existence could escape, the eternal laws of form which by philosophers have been formulated in what is commonly termed the purely formal sciences, viz., logic, arithmetic, geometry, alge-

bra, pure mechanics, and pure nature-science.[1] Even if no material object existed 1+1 would always make 2, the rules of logic would hold good, the square on the hypothenuse would still be equal to the sum of the squares of the sides of a rectangular triangle. In brief, the laws of pure reason would be the same, for they are intrinsically necessary and hold good whether we apply them or not, whether they are realised in the actual world or not, whether they are utilised by rational beings or trespassed against by fools.

One of the greatest thinkers of mankind, John Stuart Mill, actually went so far as to deny the existence of these eternal realities which constitute the ultimate authority of logical and mathematical thought. He actually said that mathematical lines, squares, and circles did not exist, and that mathematical theorems, far from being necessary truths, were actual untruths. No wonder that he came to the conclusion that we could not know whether on another planet twice two might not perhaps make five. His conception of mathematics was so unmathematical that he regarded the mathematical line, which is without extension, not as a purely ideal construction, but as a picture of real lines. Ideal was to him tantamount to imaginary; and that materiality is excluded in the conception of mathematical lines appeared to him a sure sign of imperfection which, of course, would change the whole science of mathematics into an illusion of the mind.

Strange! If John Stuart Mill were right, then a purely imaginary conception, an illusion of the mind, a misstatement of genuine reality, would be the key to our comprehension of the whole world. Is that plausible?

John Stuart Mill's misconception of the erroneousness of mathematics is based on the materialistic assumption that material things alone are real. The truth is that the immaterial laws of form are the most essential reality in the world. They shape the immaterial conditions through which things are such as they are, and these laws are omnipresent, eternal, immutable, and intrinsically necessary. In brief, they partake of all those features which

[1] *Reine Naturwissenschaft* is Kant's term, which would mainly comprise the cognition of causation and of the law of the conservation of matter and energy.

from time immemorial have been attributed to God. Is not the conclusion justified that they are parts and parcels of God?

The laws of form are not the whole of God. They are only one aspect of God, although we must grant that it is a very important aspect of his being. They are, as it were, God's thoughts, and God's thoughts are not as human thoughts, transient. God's thoughts are eternal, and they appear to the scientist as the immutable laws of nature.

The term "law of nature" is not a good term, but it is commonly used now, and we use it because we believe it is easily understood. But we ought to know that the laws of nature are not laws in the sense of acts of legislation. The laws of nature have not been decreed by kings or parliaments; nor do natural events take place in obedience to natural laws. Natural laws are formulas which describe uniformities. Our naturalists formulate the regularities which are observed in nature, and reduce them to exact statements. The uniformities of nature are not haphazard coincidences but intrinsically necessary conditions, indicating a sameness in variety and reflecting a grand systematic order that is ultimately based on the same principles as the harmonious relations met with in mathematics, logic, and algebra.

If the laws of mathematics and the laws of nature as their applications to material actuality are part and parcel of God, then God certainly is not an individual being, not a concrete ego-consciousness, not a person in the common acceptance of the term, but a true omnipresence and a true universality. Then, he is not a thisness at all, nor any particular suchness either, but that immaterial principle which conditions all suchness of things. In a word, he would be not a man, not an entity, not any creature however great or powerful, but the superreal condition of the whole world-order, of the laws of nature and of ethical norms which are indispensable factors in the evolution of mankind.

In reply to an exposition of this conception of God,[1] which takes the characteristic qualities of God seriously and defines him

[1] See the controversy with Père Hyacinthe of Paris in *The Open Court*, October, 1897.

as superpersonal not as an individual ego-being, the following criticism was received from the pen of the Hon. Charles H. Chase, Ithaca, Mich., Judge of the Probate Court of Gratiot County:

"I have been greatly interested in the correspondence between yourself and Père Hyacinthe Loyson, published in the October number of the *Open Court*. I have read your reply twice, and some portions of it several times, that I may be sure that I catch your meaning and understand your position. It is possible that I have not now caught your full meaning; however, if I am wrong, please correct me.

"First, I cannot see any distinction between your idea of God and atheism. The atheist admits the laws of nature; indeed, he refers all phenomena to these laws. They are to him unconscious, unchangeable, incapable of volition, impersonal. In fact, he attributes to the laws of matter and the cosmos the very necessary attributes which you deify. I can see no difference except in this, that the atheist says, 'There is no God, the world is governed by law;' while you say, 'The world is governed by law, and this law is God.'

"Further, it seems to me that your position as to the soul of man and its immortality is identical with that of atheism. If thought be but a mode of motion, consciousness mere oxidation; if the whole combination of man break down utterly at death; if our consciousness be extinguished at death, then, indeed, is death an 'eternal sleep,' and man is no better off than the beast of the field, or, even, the clod he treads under foot. It may be true that he now has the satisfaction that what he may do will go on forever in influence, but in ever weakening lines of force until it is lost in the vast abyss of opposing and conflicting forces. A pebble may be dropped into the sea and the particles of water impinged upon in turn act upon contiguous particles, and so on forever; but its effect is soon lost in the multitude of greater forces which overwhelm it, though in theory the influence of the pebble goes on eternally. It seems to me that your immortality of man is merely the statement of the principle of conservation of energy,—that nothing is lost; forces appear and disappear, to reappear in endlessly varied forms and conditions. If Cæsar live only in the minds of those who read of the deeds of Cæsar, who feel, perhaps unconsciously, the influence of his great personality, how can it now concern Cæsar? He cannot know; he cannot feel; he cannot will; his immortality is merely that of name. And even this cannot be immortality; for it may be but a few centuries, or a few thousand years at most, when his name will disappear from the earth, when his immortality will be only in the infinitesimal influence which his life will exert on that far-off age, being no more than that of the zephyr which fanned Cæsar's cheek, the stream which flowed by his door, and the other conditions which constituted his physical environments.

"With such a belief in God, who is unfeeling, unconscious, without volition; and such an immortality, without feeling, without knowledge, without conscious-

ness, without volition,—well might all men take the Epicurean view: 'Let us eat, drink, and be merry, for to-morrow we die.'

"If, as you say, God is superconscious, must he not also be conscious? The brute-creation is supervegetal; but the brute has all that the vegetable has, and sensation, the rudiments of mind and reason, and volition beside. Man is super-animal; and man has all the powers of the brute, and self-consciousness and higher mental powers beside. Now, if there be a state above man, superhuman, must that state not be all that is human and more? If God be superconscious, must he not be conscious? If he be supervolitional, must he not have volition? If he be superrational, must he not be the essence of reason, the absolute reason?

"Again, is not the present view and tendency of science onesided, in that it is wholly an outside view, which reveals to us only one set of facts, and not the other equally important? Must we not investigate from an inside view, from the position of consciousness, to arrive at facts to complete the view, then adopt a theory which will harmonise the two sets of facts and phenomena? From the one point of view there appears to be nothing which cannot be referred to matter, ether, and motion; but from the other standpoint no mental phenomena seem to be so accounted for. Are there not facts and truths lying at the basis of all religions, all mental actions, not referable to matter, ether, and motion? May not investigations of hypnotism, clairvoyance, spiritualism, mind-healing, faith-healing, theosophy, reveal a set of phenomena which require a different working hypothesis? May there not be a fundamental substance, the common basis of all that we call material and spiritual, which entirely eludes all attempts to bring it into the domain of knowledge, as is true of the hypothetical ether?

"There is certainly a power of selection (volition in higher forms) in life not accounted for by the current theories of evolution. Herbert Spencer supposed he had arrived at a great generalisation expressed in his formula of evolution:

'Evolution is the integration of matter and concomitant dissipation of motion; 'during which the matter passes from an indefinite, incoherent homogeneity to a 'definite, coherent heterogeneity; and during which the retained motion undergoes 'a parallel transformation.'

"It has been shown that this law, while it is true of the inorganic world, does not hold of organic bodies; that instead of there being a resultant dissipation of motion in the processes of life, that the processes of inclusion and absorption of motion exceed those of dissipation, and that the resultant is therefore an absorption and inclusion of motion. This shows a power of selection of life, not accounted for by physical and chemical laws.

"I am inclined to think there has now been sufficient evidence adduced by the London Society for Psychical Research, and from other sources, to show that the mind can act independently of the body, independently of distance, can transfer itself in space instantaneously, as in telepathy and clairvoyance; and that, if these things be true, there is no reason why the mind or soul cannot maintain after death

its identity, its consciousness, its power of volition, and all other purely psychical powers. I am inclined to the opinion that our so-called science is quite onesided, objectively so, and that a great field for investigation lies in spiritualism, hypnotism, clairvoyance, mind-healing, faith-healing, etc.

"If the vortex theory of atoms be accepted, as it is quite extensively among scientists, and it is certainly not unphilosophic, then there is a common substratum of all matter, and the various elements are but different vortices of this universal fluid. May not the ether be that universal fluid? Or the ether itself may be a discrete mass of vortices and account for gravitation and all other apparent actions at a distance, involving so apparent an impossibility, as shown by Newton. The ether is so organised that it eludes all our efforts to bring it within the range of the senses. Is it more improbable that spirit, the active selective principle of all life, should be so organised as to elude our powers of cognition? To express the ideas in another form: Gross matter may be represented by the letter x, and the ether by dx, or differential x. The relation between these is such that if to x we add or subtract from it dx multiplied by any finite multiplier, there can be no appreciable change in x. Again, if we represent spirit by d_2x, then the relation between dx and d_2x is such that to add to or subtract d_2x, multiplied by any finite multiplier, from dx, the latter cannot be changed to any appreciable extent. These relations of abstract mathematics may represent in a crude way the distinctions between matter, ether, and spirit. The first is the material of which our bodies are formed and affects all our senses. The second eludes our senses; but from the phenomena of light, heat, electricity, gravitation, molecular attractions and repulsions, the ether must be assumed, or action at a distance (an absurd and impossible action) must be assumed. The third, also, eludes our senses and appears to have no connexion with either the ether or gross matter; but the phenomena of life, mind, consciousness, necessitate its assumption.

"If in the above criticisms I have failed to understand your position, I shall be glad to be corrected."

My kind critic, Judge Charles H. Chase, says that he finds no difference between my idea of God and atheism, but his statement is based on the assumption that God in order to exist must be an individual and concrete being. He must not be God but *a* God: an ego-consciousness that thinks and acts like a human being. The atheist, Judge Chase says, admits the laws of nature, too; and I grant that there may be some atheists who do. Mr. John Stuart Mill certainly did not admit the reality of law as such. He did not admit that anything purely formal had any reality except as an imperfect picture of material things. To him one of the simplest

arithmetical laws appeared untenable if applied universally to nature, for he denied the right of assuming the existence of anything universal and omnipresent. Thus it appears that there are atheists who actually deny the reality of purely formal relations.

Judge Chase would not deny that God is superpersonal, but he claims that the superpersonal includes the personal, as the supervegetal ought to include the vegetal. And I grant that to some extent this is true. I do not deny that in a certain sense God is personal. If personal means that which is possessed of a definite character, God is certainly personal, for God is not an indefinite generality, but is as definite as are all mathematical, logical, and moral truths. But the word person is commonly used in the sense of individual, of a concrete being possessed with a thisness, as contrasted to otherness. If there is anything that God is not, he is certainly not an individual creature that is here and not there, and is endowed with a sentiment of thisness such as we possess in our ego-consciousness. And the superpersonal in this sense is at the same time as little personal as an animal on account of being supervegetal can be regarded as a plant. Plants have many functions which animals in spite of their supervegetal nature cannot perform. It is not true that the higher includes all phases and features of the lower. Let us hope at least that man as the superbrute, a creature which is higher than the brute, has dropped some of the most characteristic features of brute-existence.

Judge Chase claims that the God of the Religion of Science as proposed in my article, is incapable of volition. Perhaps he is. It all depends on what we mean by "volition." The eternal laws are not a transient volition such as are human volitions, but they are an eternal determinedness. If "will" means the transient decision of an individual creature which this same creature may afterwards regret, God certainly has no will. But if "will" means that there is a determinedness of action, the laws of nature are certainly a will. God's will is not a transient act, but an eternal and omnipresent condition; it is the consistency of the intrinsically necessary laws which determine the character of the whole cosmos.

The materialist may recognise uniformities but he does not see

their significance; at any rate, he does not recognise the laws of nature in their moral importance. Such a scientist as Professor Huxley (who was not even a materialist) went so far as to declare that the cosmic order was immoral. Accordingly, it appears to be of greatest importance whether or not we recognise the laws of nature in their divinity and moral importance. The law of love, of mutual assistance, the longing of the individual to live in and for the whole, are not unnatural conditions. They are deeply rooted in the order of nature, and I would say that the moral laws of nature are the most important features of God's existence. We are apt to overlook the actuality of these most delicate and subtle realities in the world, but almost all the human races have found them out by experience and formulated the moral laws of society in their ethical codes to a greater or less degree of perfection. At any rate the common agreement of the basic laws of morality indicate that they are based on the nature of things and that they constitute an intrinsic part of the world-order.

We should not be afraid of being classed either as atheists or as theists. There are people who look upon every one who uses the terms "soul" and "God" as either a hypocrite or a fool, and *vice versa* some pious people are satisfied with the mere belief without understanding what the words may mean. All depends on the proper meaning, not on the words themselves. There can be no question about it that there are atheists who without knowing it are God-believers. On the other hand, there are Christian theists who without knowing it are mere pagans, and who, far from believing in a genuine God, believe in a deified creature, an image of their own making whom they worship.

Judge Chase says that the God that I believe in is unconscious, he cannot feel. And certainly when we speak of nature's laws as parts of God, we do not mean by it that they are living beings such as the poets of the pagans used to describe. In a certain sense God is unfeeling, indeed. He is the eternal sternness of the world-order, the blessing of goodness and, at the same time, the curse of sin. But God is not merely pure law, he is also applied law, and he manifests himself in this world of living, sentient beings.

He is not only the condition of all existence, or, metaphorically speaking, the father of all, but he is also the realisation of everything that is in agreement with the eternal law. God is not only the father but also the son, and this is the essential significance of Christianity. God is not only the Logos as the eternal world-order, but also the Logos that has become flesh. He appears as Christ in this world of human beings. It is God himself who suffers and seeks the right path, the path of salvation. It is God himself who comes as the divine teacher to set an example to those who have not as yet found the truth. Thus the sternness of God is counterbalanced by the love and goodness of the actualised God, who in Christianity is called Christ. It is for certain general inquisitions, such as we pursue at present, quite indifferent whether we call the God-man Christ or Buddha or any other name of religious dignity. The significance is the same, and we may be sure that if there are rational beings on other planets they will develop a similar religion in which they follow the lead of a divine teacher who reveals to them the laws of eternal righteousness, universal love and goodwill towards all.

It is true that many scientists, even men of great name and fame and astute thinkers, have a conception of science which overlooks the importance of the spiritual and moral interconnexion of things. In Mr. Spencer's opinion evolution is nothing but the integration of matter and the concomitant dissipation of motion; he defines it as a progress from the homogeneous to the heterogenous. We have on other occasions called attention to this erroneous and actually false conception of evolution.[1] Evolution is not a law that can be explained from matter and energy alone. It is not a process which can be described in purely material terms with the omission of soul and spirit.

Evolution tends to the formation of the human mind, and human evolution, commonly called progress, depends upon the increase of a clearer and more comprehensive recognition of truth.

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[1] See, for instance, in *Homilies of Science*, the chapter on pp. 36–47, "The Test of Progress."

We may call it God's self-realisation, a term which will be better understood after the complete perusal of this article. Certainly, there is a deep spiritual significance in evolution, and the religious conception of evolution which would conceive of it as the manifestation of God according to the design of universal and eternal law would certainly be truer than any agnostic or materialistic statement in terms of matter and motion.

The most important application of every philosophy lies in the domain of psychology. It is natural that there the differences between my critic and myself become more flagrant.

Judge Chase is without knowing it a materialist, for to him the soul consists of an ethereal substance. Representing gross matter by the letter x, and ether by dx, he believes that we may represent spirit by d_2x. And as ether is imponderable so the substance of the soul would naturally elude detection by our senses. The main mistake of this as well as of all kindred theories of the soul consists in seeking the nature of the soul in some attenuated substance. Ether is as much matter in the general sense of the term as are the chemical elements, for indeed no objection can be made to the theory which is actually held by many most prominent physicists, that matter is but a condensation of ether. If the soul is substantial it might as well consist of iron as of ether; in our conception, however, the soul is not substantial but formal, and here as well as everywhere the formal is the most important part of reality.

Judge Chase does not seem to be consistent. He defines soul as the active selective principle of life; but is selection something that can be explained from such a substance as ether, and is it possible to think of a principle as a thing that is substantial? I grant that there is a selective principle active in man. The characteristic feature of soul, as I would say, is that which gives direction to the motions of a sentient organism. But this quality is not a substance of any kind; nor is it an energy; nor is it anything inexplicable. Direction is a matter of form, and so is that which conditions the choice made among several possible directions.

What is soul? Soul is a system of motor ideas, i. e., of mean-

ing-endowed symbols depicting the objects and relations of the surrounding world.

Accordingly, soul is comparable to the thoughts contained in a book, only that they are living thoughts. The ideas of which the soul consists are sentient forms of nervous functions which may prompt us to utter certain word-combinations, while the ideas in books consist in the forms of printed letters.

It would lead us too far now to explain the origin of man's soul. Nor is that necessary, as it has been done explicitly in other places; but we must insist on this, that man's soul is as little the cerebral substance of his brain, as the thoughts of a book are either printer's ink or paper. Man's soul as well as the thoughts of books consist of the significance of certain forms. Both are actualised through the materials upon which they have been impressed; but they are not these materials and they can be transferred upon other materials. Books are reprinted, pictures are photographed for reproduction, and the soul of every man impresses itself upon others, adding its mite to the progress of the race.

The significance of sense-impressions and of words originates through the perception of a relation between the mental picture and a certain object; it is not anything material; it is not substance nor is it force or energy. We grant that thinking takes place in the brain, and the physiological process on which the function depends is chemically considered oxidation. But for that reason thought and oxidation are as little identical as the turning of the crank of a musical box can be regarded as music.

The materialistic proposition that the world can be explained from matter and motion alone (seriously pronounced by philosophers who are sometimes regarded as deep thinkers) is simply a superstition which, when it is found to fail, naturally leads to a philosophical bankruptcy which, when glorified as the highest achievement of modern thought, is paraded under the name of agnosticism. If matter and motion contained the conditions of all things, we might with Shakespeare's clown wonder at the musical genius hidden in sheep's guts and might try to deduce the beauties of a Beethoven sonata from the friction of a bow on the strings. A

concert, the actualisation of music, is not possible without instruments, but music itself is not constituted by or explainable through the material qualities of the instruments. Music is the actualisation of mathematical proportions which are directly perceived without being calculated or at all understood in their arithmetical values. In the same way, the significance of sense-impressions and word-symbols is something relational, i. e., formal; and its most important feature is its direction-imparting faculty.

If a cat sees a dog approach, it will nimbly climb the next tree. The cat knows the dog, the tree, and its own ability of climb ing; and the cat's action is determined by the significance of the sense-impressions, which has originated under past experiences. The total amount of these memory-structures which enable the cat to interpret present impressions and utilise them for adjusting itself towards the surrounding world is the cat's soul. That the cat jumps toward the tree and not in any other direction is a quality which is not measurable in the scales of the chemist or by the methods of the physicist. It is not a material thing nor is it a force. It is purely a matter of form. That which determines the direction of the cat's motion is the significance of the mental pictures in the cat's mind.

Now Judge Chase may object, that man's soul is not the system of his ideas, but the substance in which the system of ideas is impressed. And here his theory may be introduced, that ideas are not impressed into gross matter but into the more ethereal matter called ether; to which I reply that it is quite indifferent whether the ideas of man's soul are registered in gross or in ethereal substance. It seems to me that if the soul needs must consist of a substance, it does not gain in dignity by the thinness of its substratum; at least I for my part would prefer to have a soul of solid steel than of some nondescript gas or ether. But a critical investigation will have to reject the idea of the materiality of the soul altogether and insist on the truth that the main thing of a man is the nature of his ideas, i. e., the form of his sentiments and the character of his impulses, not the substance on which they are impressed.

The term substance has been introduced for denoting a mate-

rial that might be different from matter,—a spiritual matter,—and in this sense the word has been interpreted to mean that which underlies certain phenomena, that which is standing under them or supporting them. If substance be used in the sense of forms that in material changes remain constant, we have no objection to the use of the word as something immaterial. In that case, the form of the rainbow would have to be called a substance, while the raindrop would be the material which is perpetually replaced by new material. Little, of course, is gained by replacing the notion of a sense-perceptible matter by a more subtle metaphysical matter; for both are mere materials, both denote a mere thisness, and neither, if considered as a *substantia qua substantia*, can be regarded as implying suchness, character or worth, for all suchness is a matter of form. If we compare two substances, e. g., gold and lead, we shall find that their difference is reducible to a difference of form as is actually assumed with regard to all the chemical elements in Mendeljeff's law. Supposing that there be a particular thinking substance, as there are different chemical substances, we should have to assume that its peculiarities will finally find their explanation in its structural qualities; its character would after all be a matter of form. There is no way of escaping the idea of form as that factor which gives character to things. Suppose there were a special soul-substance, what would it signify? The character of a man and his moral worth would after all depend upon form. We must shape our lives, we must build up our fate, we must train our mental and moral make-up, we must discipline our conscience, we must mould our personality. All progress, even moral accomplishments, every deed of any kind, is an act of forming.

The material of which a thing consists is only of secondary importance. The Bible is the Bible whether it is written on parchment, on silk, or on paper. The significance of the words remain the same either way. That which we call the Bible has nothing to do with the material on which the words are printed.

Now we might for argument's sake grant that the presence of ether in the brain is necessary for rendering the cerebral substance capable of performing its proper functions. What of it? Would

it bring us any nearer to a comprehension of the soul? It would simply be one step farther in the physiology of the brain, not of the soul. This is the reason why all theories which attempt to explain the soul either as a force, as electricity or magnetism, or as a substance, as ether, as phosphorus, as oxygen, etc., have always failed. They try to explain something that is purely formal by either matter or motion.

Judge Chase claims that according to our theory "man is no better off than the beast of the field." And in one sense that is true. Man's body will be dissolved into its particles just as much as the body of beasts, and this, I believe, is commonly recognised by all people alike, by both religious and irreligious. We read, for instance, in Ecclesiastes iii. 19–21, the author of which book is counted by all Christian Churches as directly inspired by the Holy Ghost:

> "That which befalleth the sons of man befalleth the beasts. Even one thing befalleth them. As the one dieth so dieth the other. Yea, they have all one breath, so that a man hath no pre-eminence above a beast. For all is vanity. All go unto one place, all are of dust, and all turn to dust again. Who knoweth the spirit of man that goeth upward and the spirit of the beast that goeth downward to the earth?"

The physical part of man is in exactly the same predicament as the physical part of any beast. Man's body consists of matter; it is dust and to dust must it return. There is nothing of man's material elements that could escape disintegration in death. And supposing that in addition to the gross matter of which man's body consists there existed some ether in his brain, it is more than probable that those more rarefied substances would as much undergo disintegration as any other. If man's immortality depended upon the preservation of a substance, there would be no hope for him beyond the grave. The ether-soul which according to the belief of past ages quits the body at the moment of death and flits about from place to place, would be subject as much to a final dissolution as any material combination.

But man's soul is not material; it is formal; it consists of

ideas, of thoughts, of aspirations. And because man's soul is formal it can continue, even though the body may become a prey to death. Man's soul continues through his works; being a certain form of life-activity, man continues in his personal identity wherever this peculiar form of life-activity is preserved.

The existence of death in the world, from which no living creature can escape, appears terrible and oppressive, but as soon as we know that the soul of man is immaterial, and that, therefore, it is not touched by death, we have good reason to feel comforted. And he who understands the situation will lose all fear of death and rise into that higher plane of ideal life which characterises or ought to characterise every man of religious aspirations. In this sense the preacher continues (*Ibid.*, 22):

"I perceive that there is nothing better than that the man should rejoice in his own works, for that is his portion."

Judge Chase objects to this conception of immortality as being merely a statement of the principle of conservation of energy, but that is not so. It is a statement of the principle of the conservation of form. It is true that energy is preserved and matter is preserved, but both matter and energy change their forms, electricity is changed into motion, into heat, into potential energy, etc., etc. And similarly the chemical elements undergo various combinations in which they act differently according to circumstances. Some forces become latent, others become apparent. In new combinations, some properties seem to disappear while others rise unexpectedly into prominence as if created out of nothing. The conservation of soul is radically different from the conservation of matter and energy. Nothing that is material is preserved of an organism in its organised structure. The organism, materially considered, is a constant flux. It is comparable to an eddy in a stream where the conditions remain to a certain degree constant, so as to produce the same form of a whirl. The whirl consists of water, but the whirl is not water. You can analyse all the particles of water and the chemist will never discover what the nature of a whirl is. A chemist will search all the raindrops in vain if he searches for an explanation of the rainbow. It is true water is needed to make whirls and rain-

bows, but the water only furnishes the material for their makeup, and it is quite indifferent which drops pass through the place where they originate. The same is true of man. It is upon the whole quite indifferent at which bakery we buy our bread, or whether the wheat grew in Russia or Dakota. The question of where our cereals grow may be of commercial interest as considerations of political economy, but has nothing to do with the soul. Man's soul is neither the amount of material particles of which at the time his body consists, nor is it exactly those footpounds of energy which are stored up in the body's tissues. Man's soul is constituted by the form in which both matter and energy appear united in his body, and form implies the significance of ideas and the tendencies of aspirations.

Now the question arises, Whence does man's soul come? Does it originate out of nothing at the day of his birth or at the moment of conception? Is there any possibility of interpreting its origin as due to a transference of substance of some kind. Suppose the soul were some definite ethereal soul-substance radically different from matter and from substance of any other kind. How could we explain the increase of soul on earth? A few millenniums ago whole continents were without population. They were inhabited only by brutes of the lowest order, and now the whole earth is peopled with rational beings. Is there a soul-substance which by being fed increases? Does the law of conservation of matter not hold good for soul-substance. All these hypotheses are *prima facie* absurd. There is only one theory which explains the unlimited increase of souls, and that is the recognition that soul is form. Form can be increased. Indeed, form can be created out of nothing, and considering that the whole creation of this world is a formation, the old dogma of the creation of any new world-system out of nothing through the intervention of the divine Logos is philosophically justified.

Man's soul is in a certain sense a creation out of nothing, but for that reason its production is by no means a mystic phenomenon. The soul of the baby originates by reproduction. As every tree reproduces its own kind in its seed, so does mankind. The kind, the type, the form, is potentially contained in the seed. The formative

element of the seed is the essential part. The material element is unessential; and as a certain mass of matter is indispensable for formation of any kind it is reduced to a minimum.

Judge Chase declares that man's immortality would be comparable to the action of a pebble that is dropped into the sea, the effects of which are as much preserved as is man's soul. And Judge Chase is right to the extent that the immortality of man's soul is as certain as the conservation of the action of the pebble upon the sea. In relation to the whole universe it is perhaps also infinitesimally small, but he is greatly mistaken when he thinks that the infinitesimal influence of a life is lost in the further evolution of mankind. The very reverse is true. The importance of man's soul increases with the progress of mankind, if only his soul be of the right kind. Think only of the inventor of the wheel or the inventor of the needle. Their souls still live and have been added to by later inventions. Is it not a great comfort to know that our souls do not only continue beyond the grave but that they are even capable of a higher evolution, of a spiritual increase and of better formulation with greater exactness and precision! Far from being lost at a distant age, the soul of man gains in influence, and, if it is a power for good, will become a source of ever increasing blessings.

The immortality of Cæsar in this conception is not that we read about Cæsar in our school books, but that the deeds of Cæsar remain a factor in the future evolution of mankind; it is not the knowing about Cæsar nor the preservation of his name, but it is the reproduction of the very deed-forms of himself.

It is apparent that not all the deeds of Cæsar are equally immortal. Some of them will retain a greater and others a smaller influence. Some of them may be almost entirely obliterated, but there are features of his which by the selection of the fittest will survive for the benefit of mankind, and that exactly is the immortality of his soul, and this immortality is not limited to the people of whom we read in books, to the men of fame, but is as powerful in those whose names remain unknown: in the mother who brings up her children with love and care, in the father who toils for his

family, in the honest laborer who plods in the sweat of his brow to make a living.

Judge Chase, and probably other critics of our views will probably say that they want an immortality not only for prominent men but for everybody; and I reply that this immortality is for everybody and for everything. To be sure it is not for everybody and for everything alike. It is different for the action of the pebble on the sea and different for the hero who dies for his cause. It is purely physical in the former case, it is moral and ideal in the latter case.

The difficulty of preserving the soul of everybody consists in the rarity of original souls of importance. Most original minds are simply aberrations and the men who have discovered a new truth or set a noble example are few indeed. But every Tom, Dick, and Harry, who are at best mediocre reproductions of average souls, without any originality of their own making added thereto, also want to be assured that their puny little egos will be preserved. For this kind of people the idea of a substance-soul is naturally the best comfort, for not having any particular suchness, they cling to the thisness of their existence, and will be sorely disappointed when they find that the preservation of any thisness is not conformable to the laws of existence; man's aspirations characterise his suchness; they are ideal not material; they belong to the realm of thoughts, not to the realm of concrete objects.

I know there are people who believe that ideal means unreal, but that is a mistake. They are materialists who believe that whatever is formal must be non-existent because it cannot be touched by the hands or noted by any one of the other senses. Things ideal, i. e., presences that consist of thought-relations, are spiritual, not material, but for that reason they are as real as any stone and as actual as any one of the forces of nature. The formal, and especially the spiritual, is truly, as the Greek calls it, the causative in the world, *αἰτιώδης*.

It is difficult for mankind generally and especially for the primitive peoples of an unscientific age, to conceive of the paramount importance of the purely formal. Crude thinkers are apt to materi-

alise or even personify that which is immaterial. And thus we have the strange phenomenon that spirit is characterised as breath, as air. It is always supposed to consist of the thinnest material conceivable, and so the notion of an ether-soul recommends itself to the materialists of the present generation. But the spiritual is no substance whatever. The spiritual is formal, and the formal is not a nonentity but is the most important factor in the world.

The formal is not only in the world, but the formal relations form an abstract world of their own. There is a supernatural world of form which has been called by Philo "the realm of the Logoi," by Plato "the world of ideas," by Kant "the purely formal or transcendental."

If there is any truth in the Hegelian conception of the absolute, we must regard the formal relations as absolute. They are intrinsically necessary. Logical and mathematical theorems are not inventions, they are discoveries: they are true if considered for themselves and without reference to material things such as exist in nature. In this sense they are superphysical and form a supernatural realm; not as if they were remote from nature, but by being applicable to any possible nature. If new universes of a different kind were created, the eternal verities of formal relations would hold good for them as they do for our actual world.

The supernatural or hyperphysical world consists of all those eternal verities which would remain true even if the world did not exist. Pure mechanics is a kind of hyper-physics which explains the laws of physical motions. In *abstracto* and according to an *a priori* system, the laws of pure mechanics hold good for any kind of practical mechanics. The purely formal world is that system of laws which are absolutely true, but at the same time shape the real world and condition all its transformations. Therefore, the purely formal sciences are the key to the natural sciences. They are not real, they are super-real, and the truths which they reveal are not results of sense-experience but products of pure reason.

One most important feature of all the formal truths is this, that they stand in a decided contrast to the material world of sense-experience. They do not consist of a heap of single facts but they

form one grand system. The more we understand the nature of the formal sciences the better we learn that all of them are one and the same truth in its various applications. The simplest of them are most obvious, and the most complicated of them are nothing but the very simplest applied to complicated conditions. And not the least important aspect of the purely formal sciences is their moral importance. Not only is there a morality, nay a holiness, about the multiplication table, but morality is nothing but the rigidity of the formal laws applied to practical life, especially to the relations between man and his fellows.

If we consider the purely formal, the immaterial or hyperphysical as a whole, we understand its moral application better, and in this sense it has been allegorically represented as the father of all life, as the creator, as the Lord of the universe, as God. The attributes of God as soon as God began to be philosophically understood, are eternality, omnipresence, rigid impartiality or justice, omnipotence, omniscience. Omnipresence is only another name for universal; the former is a religious, the latter a philosophical term. To these qualities were added later on the more moral attributes of love and mercy. Now, if there is anything in the world which is capable of being called eternal and omnipresent, it is these immutable relations which are systematised in the formal sciences. They, if anything, are omnipresent and eternal. They are uncreated and indestructible. If there is anything in the world that can be called omniscient it is the sum-total of these sciences, for they are nothing less than the source of all knowledge. Indeed, a recognition of the purely formal and its eternal laws is the organon, the instrument and means by which alone we can classify and comprehend the data of experience.

It is understood that God, this omnipresence of the formative factors of the world, is not possessed of a knowledge such as man's is. It is a higher kind of knowledge. God's thought is not a series of representations. God's thoughts are eternal truths. God's thoughts exist forever and aye in the shape of determinations which are regulative features of the universe such as can be formulated by scientists in laws. Accordingly, such omniscience is not a dialectic

or argumentative or discursive knowledge of detail thoughts. It is not a consideration of single events or things. It consists in the universal arrangements of reality itself. To be sure it includes all details in its universal embrace by being present in them in its undivided entire divinity. There is not a mote in the air which can escape it or be deprived of it; or, as said Christ, "not one of the sparrows shall fall to the ground without your father." (Mat. x. 29.)

When speaking of God's omniscience we are too apt to think of his thought's as being like ours, transient and discursive, but they are eternal and omnipresent, and in this respect infinitely different from human thoughts. And this is good doctrine too which orthodox belief will not refuse to accept, as we read in Isaiah lv. 8–9:

"For my thoughts are not your thoughts, neither are your ways my ways, saith the Lord. For as the heavens are higher than the earth, so are my ways higher than your ways, and my thoughts than your thoughts."

The same is true of God's omnipotence. God is not a force that can be measured in footpounds. His strength is not power of muscle nor the might of armies. God's omnipotence is the irresistibility of his omnipresent will. It is the irrefragability of what appears to the scientist as the silent workings of natural law; it is the inevitable efficacy of the small, still voice—a truth which was found out by the Greeks, with whom the saying became proverbial:[1]

ὀψὲ θεῶν ἀλέουσι μύλοι, ἀλέουσι δὲ λεπτά.

Friedrich von Logau embodied this idea in a *Sinngedicht* which Longfellow translated as follows:

"Though the mills of God grind slowly,
Yet they grind exceeding small.
Though with patience He stands waiting,
With exactness grinds He all."

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[1] In this form, which is most commonly quoted, it is found in *Adversus Mathematicos*, by Sextus Empiricus; but the same proverb occurs with a slight variation in Oracula Sibyll. 8, 14. See Büchmann's *Geflügelte Worte*, p. 231.

The human conception of God's power has resulted in the belief in miracles, after the fashion of magicians. But God is not a magician-deity, a miracle-monger. God's omnipotence does not consist in overleaping the laws of nature. It does not show itself in irregularities or exceptions. God's omnipotence consists in the immutability of his will as the formative factor of nature. Whether God's laws are obeyed or disobeyed, the law will hold good. There is no possibility of changing him or escaping the fulfilment of his will. The good man, whose actions are in agreement with God, realises the blessings of God's will; the bad man, who infringes upon his decisions changes his blessings into curses; but God remains the same in either case, and the possibilities of his nature in their various applications are inexhaustible. If miracle is a name of that which ought to impress us with awe, then there is but one miracle in innumerable applications. But how paltry are the miracles which the superstitions of the past have attributed to God in comparison with the miracles of the inventions of to-day which have become possible by a better understanding of God's thoughts, the laws of existence.

It is natural that primitive people did not see the goodness of God. They were too dependent on the forces of nature to see the deeper aspects of the divine law that works for progress in the intellectual world and not less in the moral world. The soul of the savages contains too little of God's true nature to know him correctly, their faculty of perception is still too dull, and therefore they see him only in the thunder-storm and hear him not in the still, small voice.

If we properly understand the origin of man's soul and the continuance of it beyond the grave, we learn to understand man's relations to other living creatures. Man's mind is formed in the mould of God's eternal thoughts and all the creatures coming from the same form are brothers; to the extent that they are like one another they are like different editions of the same book. The fatherhood of God teaches us the brotherhood of man. A consideration of the importance of suchness helps us to comprehend the relative irrelevance of thisness and implies the lesson which in In-

dia has been expressed in the words *Tat twam asi*, i. e., "that art thou." Other rational beings are, not less than myself, incarnations of the superphysical; they too, with more or less success, seek for deeper truths and long for a higher and nobler life. Have we not all one father, and are we not all brothers?

When we understand whence we come we learn also whither we shall fare. We come from the souls of the past and our soul will continue in the souls of the future. There is the same identity between the souls of the past and the future as there is between the soul-life of my own yesterday and of my own to-morrow. There is a continuity of form and there is a preservation and transference of the various particular forms which constitute our suchness, our character, our personality. Former souls are not strangers to me. They are soul of my soul and parts of the same spirit-life which at the present day pulses in my brain. Nor shall I remain a stranger to the souls to come. There, within the souls of the future generations, not somewhere in the sky, is the Kingdom of God of which Christ spoke. Heaven is not local, not material, but spiritual. In the soul-life of mankind are the mansions in which there is room immeasurable for all of us. There we shall be preserved with all our peculiar idiosyncrasies in our personal identity.

My friendly critic expects new light from the revelations of clairvoyants, spiritualism, hypnotism, mind-healing, and theosophy. He hopes that they will somehow throw some unexpected light upon the problems of the soul. And no doubt we shall know more in the twentieth century than we knew in the nineteenth. But the hopes which Judge Chase cherishes will probably be illusory, for the abnormal phenomena of hypnotism have so far proved nothing, except what we might have known, or rather what we ought to have known, from a careful observation of normal phenomena. But such is man. Once he is accustomed to the most wonderful phenomena of nature he will no longer notice its grandeur, but regard it as a matter of course. He will no longer notice what he is accustomed to and it will appear to him as a mere nonentity. If he be confronted with the same thing in some ugly and distorted form he will be overawed with astonishment and be brought down

to his knees in wonder. The mere fact of man's consciousness which mirrors the world in the shape of a picture of reality, and in addition classifies natural phenomena in the methodical system of a rational comprehension, elicits no admiration of the cosmic order at all. We have dreams and see in our dreams the faces of our dead brothers and sisters as if they were still alive; they prove themselves living presences to us as parts of ourselves, and we can touch them as if they had real bodies. We can speak with them and receive their answers. But people say "Such are dreams," and that is with many the end of their appreciation. Yet when we see consciousness distorted in dreamlike conditions, in a so-called hypnotic or clairvoyant state, we imagine we have seen something grand and are on the track of discovering valuable truths. When a philosopher by the determination of his will exercises self-control over physical ailments, as Kant did when he mastered his attattacks of asthma, or when a general such as Frederick the Great, by his genius makes apparent impossibilities possible, conquering foes who, counting all the armies that were in the field against him, were ten times his superiors in numbers, or when a small nation like the Greeks, with a few thousand soldiers, triumphs over the millions of Xerxes's hosts, we are apt to make little of it because we can understand the laws according to which these events became possible. But when a faith-cure healer practices the same things under our very eyes on a small scale, and sometimes very blunderingly, we begin to believe in miracles, and are liable to be thrown off our balance.

Telepathy is a truth which is commonly practised in life. But the telepathy of our daily experience is different from the telepathy which the believers in psychical research try to establish. Every telegram is an act of telepathy. Indeed every sensation is telepathic. It is a sensing of that which is far. It is the act of experiencing the presence of something outside of us; and many things which our senses take note of, are at an enormous distance. The stars which we see are infinitely far, and yet we sense their reality and know of their existence! Nor is man's mind limited to the present. His memories reach back into the past, and with the as-

sistance of reason he can reconstruct the farthest event and read the origin of his own life and of the planet on which he lives. In addition he can anticipate the future. If this is not telepathy, pray what is it? I know that those who profess to believe in telepathy, as a rule, try to establish the existence of a telepathy which works without means of transmission, but such telepathy is both absurd and unnecessary, and the conception of it is an erratic idea.

We hasten to our conclusion. Religion is neither an aberration nor do its truths stand in any conflict with science. Religion is an instinctive formulation of those truths which mankind needs for practical life. The savage gropes after these truths without finding them. He feels that there is a spiritual factor in the world and he attempts to find it, but his conceptions of the spirit life are not only crude but also false. His God is formed after the pattern of his own savage mind. The religious genius of a primitive civilisation takes shape in the prophets who, poet-like and intuitively, understand the deeper significance of spiritual life, but even the prophets of the early ages use allegorical terms. They still materialise God, they still speak of the soul as though it were a substance. But how can they do otherwise? Firstly, they know no better, for they see the truth as through a glass darkly and not face to face, and secondly, if they could have expressed themselves with the exactness of modern science, they would not have been understood by their contemporaries. The prophets abolished bloody sacrifices which are a relic of savagery, and taught mankind the blessings of love. A savage chief may still think that he has disposed of an adversary when he has killed him, but experience will soon teach him that the dead may be more powerful than the living. A man who is killed is bodily but not spiritually dead. The example of his life, the experience of his soul, the influence of his personality remain after his death, and will naturally produce the belief of immortality. Nor is this instinctive belief an error. It is an undeniable truth formulated in allegories which, however, if taken literally, lead to superstitious notions.

Every man has the religion which he deserves. A sensuous man has a sensuous religion, a spiritual man a spiritual religion.

Be sure that if you meet a man who believes in a hell that is actually burning with brimstone in which the souls are roasted as the ore is roasted in the kiln, he needs that kind of sensual conception for keeping in check the savage impulses of his nature. If spiritualists believe that souls hover about them in the air in invisible winged forms, be sure that their lack of intellectuality needs a belief in the corporeality of souls; otherwise they would believe that souls have no existence and that the spiritual immortality such as the Religion of Science teaches is mere verbiage. There are people who need a religion of rituals, and it is good for them, for it educates them until they learn the truth that is expressed in rituals. I do not say that the lower religious phases should be left alone and undisturbed, that mankind should be left untaught, or that progress should be checked, but I do say that the lower stages are necessary stages of transition, and we cannot expect to lift the savage right at once to the height of a scientific conception. It would not do to send a boy who has not yet mastered his A-B-C's to a university. We must continue to teach mankind and point out the way which leads higher without losing patience with those who are slow in comprehension. We must fearlessly investigate and explain the mysteries of the spirit, but at the same time we must not expect to reap a harvest when we have scarcely sown the fields. It is natural that those who still cling to the symbols as if they were themselves the truth will be unable to comprehend the truth stated without employing the symbol, and in the same way those who still believe in a material God and a material soul will regard every view which teaches an immaterial God as atheism and an immaterial soul as a denial of the existence of the soul. Form and the purely formal are not nothing, and the philosophy which recognises the paramount importance of form is not nihilism. On the contrary it opens a vista to a scientific comprehension of God and the world, and will show us face to face what formerly appeared unintelligible and mystical.

If the term God must literally, and not allegorically, mean such a personality as our various catechisms define it to be, and if we should not be allowed to seek for a deeper and truer signifi-

cance of this most potent symbol of religious thought, science would most assuredly have to confess that there is not only no evidence in favor of the existence of God, but even that the problems of life are more easily explained without resorting to the theistic hypothesis. But why should we regard the definition of a word as unalterable in the face of the fact that all our fundamental notions, such terms as life, matter, force, have undergone similar changes. Life is still as real as ever, although our physiologists have discarded the materialistic view of life as a vital substance; fire still burns, although our physicists have ceased to believe in the existence of a phlogiston, or fire-stuff with its mysterious qualities. Electricity has become more useful than ever since we have abandoned the error of an electric fluid. So the soul will remain as grand and noble as ever, although the old psychology which assumes the existence of a peculiar soul-substance will give way to a purer and more scientific conception of the soul. And finally the idea of God which in its common acceptance is gross and pagan, will not lose by being freed of its materialistic accretions which at present are the most serious objections of scientifically trained minds to the religion that is still preached in many of our churches.

One thing is sure: that the God of the Religion of Science is not a negation of the old God-belief, but its completion and perfection. It comes as the fulfilment of a prophecy. I would not deny that the way to a comprehension of this higher God-conception leads through atheism, but where has any one found any truth worthy of the name who has not had to pass to it through doubt and had to gain it by the exertion of a close search and painstaking inquiry? Let us no longer hold atheism, I mean honest atheism and honest doubt, in abhorrence, for they are the indispensable stepping-stones to a clear and scientific comprehension of the truth. Let negations have their way; the sooner the truth of a negation is seen the quicker will its one-sidedness become apparent and lead to the new formulation of a higher and more exact positivism.

In his personal development the author of this article has successively passed through all the stages of belief, and can therefore

appreciate the arguments proffered from all sides. He knows from his own experience and still cherishes the sacred longings of a childlike mind Godward, and he is at the same time conscious of the truth that lies in the negations of atheism. But having regained a positive attitude through formulating the truth of the negations to which his conscientious doubts led him, in affirmative terms, he can now better understand the religious aspirations of his childhood and has ceased to look upon the imperfections of creeds as absolute errors. Life is evolution, and we, the children of the age in which the doctrine of evolution has for the first time been recognised in its sweeping importance, should not hesitate to understand the necessity of a progress from the mythological through the metaphysical to the positive and purely scientific. Why should we recognise this law in science and philosophy and refuse to recognise it in religion? And if the mythology of science contained the germs of glorious discoveries and inventions, should not the mythology of religion, too, be the prophecy of a purely scientific religion?

Let us have the confidence that evolution leads higher. The criticism of science will break down only the unessential, but the deeper insight which science affords will open our eyes to new truths and will show us the old truths in a new and a clearer light.

The God of the Religion of Science is in one sense the old God still, and our Godward aspiration still pursues the same aim, which is *sursum*. God is different only in so far as our conception of Him is purified,—for when I was a child I spake as a child, I understood as a child, I thought as a child; but when I became a man I put away childish things. In the place of childish hopes and notions I now have matured thoughts and manly aspirations. God is not a God of stagnation, He is a God of evolution, whose motto is: "Behold, I make all things new!" In that sense we sing the old hymn with new words:

Nearer my God to Thee,
Nearer alway;
E'en though thou other be
Than prophets say.

Other thou art but higher
Bidding our souls aspire ;
  Godward alway.

Doubt comes from God, in sooth,
  Though conquering creeds ;
Doubt prompts our search for truth
  And higher leads.
Who on doubt's path ne'er trod,
Ne'er saw the face of God :
  Doubt truthward speeds.

Science the burning bush
  Where God doth dwell !
Truth and its onward rush
  Nothing can quell.
God is the truth that guides,
Heaven where love abides :
  Sin's curse is Hell.

God the eternal cause
  Of truth and right ;
Oneness of cosmic laws,
  Reason's true light.
God, though nowhere confined,
Yet in the human mind
  Showeth His might.

God is man's truthward call,
  Noblest desire.
He's in life cosmical,
  Love's holy fire.
Thou who art All in All
God superpersonal,
  Lead Thou us higher.

EDITOR.

LITERARY CORRESPONDENCE.

I.

FRANCE.

ONE COULD NOT GIVE higher praise of M. CHARLES MISMER'S work *Principes sociologiques* than to say that, after eighteen years, a second edition of it has been able to appear without loss of interest. The author has embodied in it some detailed corrections and made some important additions, principally in the second part where he forcibly expounds his idea of the inequality of the human races and draws up a *résumé* of the history of France from a point of view which admits of contradiction but which is certainly novel.

One will doubtless be astonished that M. Mismer has remained almost an entire stranger to the great sociological production of recent years, but his work is original from the start and is the product of his personal experience which was acquired in widely different situations in the course of a life of voyages and adventures. The sociological literature would have disturbed his observations rather than have augmented them, and we must take his book as he has given it to us. What is necessary to "constitute a science"? To show how certain series of facts vary as functions of other series. This statement is true of the sciences of nature and cannot be less true of the sciences of men. The method to be followed consists, then, in studying distinct groups of events which are compared with one another according to appropriate methods, and in formulating the laws of their variation wherever it is possible to grasp them. The result was, when sociology was in its infancy and

when some subject-matter for analysis is to be had, that a generating or causal series was selected or assumed; for example, the case of Comte who referred the events of history to his law of intellectual evolution. But whatever be the importance that Comte attached to his law of the three stages and to the high generalisation which it embodies, he nevertheless distinctly felt the necessity of penetrating into the details, and he pushed his way in this direction as far as he could for this time.

M. Mismer seeks behind the fact of mental evolution for the principles capable of governing that evolution in its entirety and the social phenomena which are incarnated in it; and his principles are the principles of *perfectibility* and *solidarity*, which, being compared by him to the law of universal gravitation, would by analogical induction be central features of all existence, organic or inorganic. These principles being established, every new institution, political or social, should then be judged according to the degree of perfection which it exhibits over its predecessors, and its perfection finally would be determined by the degree of solidarity which it realised. It is obvious that these principles can be accepted without peril. But it cannot be denied that practice requires other data, and that the solution of social questions demands the analysis of numerous facts which lie between these broad general principles and concrete reality. M. Mismer does not dispute this, and in his chapters on marriage, universal suffrage, and public instruction, he appeals to considerations regarding social classes and races in particular which seem to dominate all his views of sociology. He also prizes religious organisms highly, such as Islam, and refers them to the natural conditions in which they have taken their rise.

American readers will doubtless be of the opinion that his propositions regarding human inequality have sometimes inspired him with too great a prejudice against the spirit of the new age and an excessive mistrust of individual liberty. But this lies rather in the form than in the essence of his thought. M. Mismer, though he rejects unbridled liberty still constantly appeals to the initiative of man. He knows quite well that one cannot oppose the current of history and that societies are machines which we cannot reverse.

Certain of his conclusions seem to have been first dictated to him by a patriotic concern for the destiny of France.

I would emphasise, moreover, the just principle upon which M. Mismer bases ethics—namely, the sanction of acts by their consequences. He has many beautiful passages upon this weighty question, and I for my part believe that it is impossible that experience should contradict the moral truths and sentiments which it has implanted or consolidated in the human heart. It remains for me, finally, to commend his bold induction concerning the solidarity of the worlds and the existence of a real cosmic ethics which seems to be necessary to the modern conscience.

From whatever side one approaches this work, one cannot refuse to recognise it as a remarkable production, and one has also the feeling that there is behind it a sincere and powerful personality. In the lack of solutions which will satisfy him completely, every reader will find in it ample material for reflexion and discussion, and this is the highest ambition of the author, as the motto which he has prefixed to the volume testifies: *penser, faire penser* (Think and make think).

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M. Émile Durkheim gives us a work entitled *Le suicide, étude de sociologie.* His study is exemplary, both for the care which he has taken in collecting the statistical data, and for the penetration and common sense with which he has interpreted them. In the discussion which has sprung up between the sociological school which he represents and that of which M. Tarde has become the herald, I have never hesitated in according my preference to M. Durkheim, while at the same time highly appreciating the merits of his adversaries. The latter, however, are actually beginning to deny sociology. In reducing it to psychology, that is to say, to the unguided struggle of individuals, they have interdicted the conception of any law whatever of historical facts; they have abandoned evolution to the direction of chance, and by a singular contradiction deny the reality of social phenomena *sui generis*, while at the same time making individual psychology still depend upon the existence of society.

If I am not mistaken the study of M. Durkheim is the best refutation of the doctrines of the so-called psychological school according to which sociology has no other rules and no other instrument than "laws of imitation." For the most obvious upshot of the statistics when properly analysed is the influence of external social causes and of antecedent social phenomena, which contribute to determining the present state and hedge the individual in on all sides. Suicide, which appears to be a purely individual act and primordially attributable to a state of disease, distress, etc., appears on the contrary as determined by general causes and by the circumambient moral state. It springs from the characteristic structure of a society, but it particularly marks the degree of disintegration of the elementary groups composing it, and at the same time the dissolution of the moral sentiments upon which it lives and which nourish it.

Individual dispositions undoubtedly do bring it about that the current of suicide seizes this rather than that individual, but the percentage of suicides remains independent of psychopathical conditions, as it does also of climates and seasons. It varies solely with social happenings, wars, revolutions, moral and economical crises, political or civil institutions, religion, marriage, etc. This percentage which M. Durkheim has succeeded in accurately determining rises or falls with a degree of integration or disintegration of the social elements, or, stated in other terms, according as institutions, religion, marriage, etc., have a more or less firm hold upon individuals. Certain statistical facts are explained on this hypothesis which at first seem very strange. For example, that the number of suicides is greater in Protestant countries and even in the Protestant part of the same country than it is in the Catholic countries; that the establishment of divorce lowers the percentage for wives and raises the percentage for husbands, and that hence an indissoluble marriage is beneficial to the man in this regard and unfavorable to the woman.

It would be curious to know in this matter the statistics of countries in which polygamy is legalised. I regret especially that M. Durkheim has not collected, or at least has not inserted in his

work, the statistics of the United States. It would have substantially aided him in determining whether the more active participation of women in social life is really the preservative for them that he claims it is. His careful researches on the relations of suicide to marriage and celibacy conduct him to highly interesting considerations regarding the respective rôles of the two sexes; but I cannot touch upon these points here, and leave to the reader the task of meditating upon the practical consequences which M. Durkheim has drawn from his studies.

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M. Henri F. Secrétan in *La société et la morale*, and M. J. J. Clamageran in *La lutte contre le mal* treat almost of the very same questions and show the same tendency of view regarding the future of modern societies. M. Clamageran, who is one of our most distinguished parliamentarians, seeks to justify individual effort, to define the useful spheres for the activity of the social power, that is, of the State, to show the value of free association under whatever forms, and to emphasise the benefactions of the religious spirit which our time has so mistaken under pressure of the necessity which existed of repressing the ecclesiastical power. His book is the work of a wise and practical man. That of M. Secrétan is rather that of a moralist who proclaims himself worthy of the name he bears. I call attention to such aphorisms as the following: "Is it not a supreme mystery that man can conceive being only as permanent and that this notion is formulated in a consciousness which seems transitory?" Or the following: "To have a metaphysical conviction it is necessary to be restricted or to restrict oneself." His philosophy concludes for union upon the field of action; for "to live is to act."

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M. L'Abbé C. Piat shows greater ambition in his carefully worked out book, *La personne humaine*. The objections which he advances against the modern theory of the soul are not true, but he has cleverly presented them. The chief thing to be remarked is that the battle constantly turns about the question of method. It has ever been so since the *Discourses* of Galileo and the *Organum*

of Bacon. The Abbé Piat particularly reproaches his adversaries with the usage which they make of the "exclusively empirical method" in the problems of psychology. "People have ceased to reason," he writes, "in their effort to observe better." But after the method of pure introspection has furnished all that it could upon the question, is it not proper that we should endeavor to enlarge the boundaries of our knowledge by recourse to experiment, pathological observation, etc.? It is at least a step in advance when men like the Abbé Piat enter the lists. We may felicitate ourselves upon their accepting the services of experimental psychology and in attributing to it a useful rôle, even though they proclaim that the last word is not spoken by it and that there exists "a fundamental psychology which has nothing to do with physiology.

This reservation is partly legitimate, and I can appreciate the bias which has dictated it. But I think that the spiritualists have quite exaggerated fears regarding the dangers to which the adverse doctrines have subjected social ethics. If it be certain that ethics has sprung from the long experience of the human race, or that at least experience has constantly justified the principles of ethics, how can we suppose that the experience of to-morrow will annul the experience of to-day? Its living lessons will remain the same, whatever system philosophers may construct. Of a truth, their quarrels concerning free will, responsibility, sanction, etc., which incessantly recur, recall to mind the piquant scene which one of your most distinguished poets, Theodore Tilton,[1] has recorded as taking place between an old Christian monk and a grave mussulman sage, who at each turning of the moon came together and mutually regaled themselves by discoursing constantly on the same subjects without ever understanding each other:

"And when the same new moon was new once more,
The same old men
Thus met again
And had the same old wrangle as before!"

[1] His *Complete Poetical Works*, in one volume, recently appeared in Paris, London, and Oxford (European edition, Oxford, Blackwell, 1897). The poem mentioned is entitled "A Query for Quidnuncs."

Dr. Paul Sollier offers us more exact solutions in his *Genèse et nature de l'hystérie, recherches cliniques et expérimentales de psycho-physiologie.* This two-volume work, of which one contains the "observations" only, is quite remarkable, both for the wealth and quality of these "observations" and for the clear and new conclusions which are based upon them. M. Sollier combats with great force the theory which reduces hysteria (Pierre Janet) to a pure psychological state, like the fixed idea, for example. According to him, and I believe he is right, this psychological state is explained by the physiological state, which is characterised by the more or less profound anæsthesia of a larger or lesser number of nervous centres. In hysterical subjects the nervous centres are asleep. All their subsidiary symptoms, all their stigmata so called, are due to disturbances of the sensibility. These patients are somnambulists or vigilambulists, i. e., somnambulists who appear to be awake. The different functions of their organism are disturbed in proportion to their anæsthesia, and these functional disturbances give place to the most varied kind of accidental symptoms according to the region which is affected and the mental co-ordinations which are inhibited. The consequent method of cure which M. Sollier practices with success and pride is to effect an awakening of the sensibility. He most frequently succeeds by employing some command formulated in general terms as: "Feel your heart, feel your head," etc., but never by a suggestion properly so-called. He regards the latter—and I request that his declaration be particularly heeded—as a detestable and dangerous proceeding, especially when the anæsthesia is slight; for in such cases the operator only strengthens and provokes the gravest symptoms of hysteria. M. Sollier restricts himself to giving a start to the phenomena of reaction and does not determine their course. The awakening proceeds by physiological laws, which depend neither upon the hypnotiser nor upon the patient.

These clinical observations also furnish us with further results, the importance of which will not escape psychologists. M. Sollier has discovered the existence, at the periphery, of painful points corresponding to the zone which is affected. The most important

of these are those which lie over the nervous centres (the brain and the spinal cord). Each organism has its own sensibility. It has also its point where the pain is localised, when anæsthesia supervenes. This circumstance, it will be understood, offers a new means for verifying or recognising cerebral localisations, and so M. Sollier has furnished a new demonstration for the localisation of the visual sense in the occipital region (Munk).

We shall also point out another consequence of these studies, relative to the almost exclusive favor which, according to M. Sollier, the motor theory enjoys in present psychology. For him movement is subordinate to sensibility. He attacks, finally, with sound arguments, the duality of the body and the soul. He even formulates a theory for the production in the brain of sensations, and then of images, and finally for the formation of personality.

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The book of M. PAUL REGNAUD, *Précis de logique évolutioniste, l'entendement dans ses rapports avec le langage*, is certainly the work of a learned linguist, but his definitions are frequently wanting in precision and clearness. I shall not take sides, now, between the school which M. Regnaud represents and that to which M. Victor Henry belongs, whose "linguistic antinomies" M. Regnaud vehemently assails. I shall limit myself to an observation touching the exaggerated importance which the majority of linguists and some philosophers attach to the phenomena which have been called "diseases of language." These diseases are said to have given birth to myths. It has been unjustly supposed that the savage is not susceptible of receiving false images through his senses (what of illusions, then?), or at least is not susceptible of interpreting falsely correct images by his reason. To take a name for a being, to take the sacred fire for Indra or for Jupiter, what is it if not yielding to a natural tendency of the mind? Is the truth not this: that man, and especially primitive man and the child, spontaneously conceive things under the form of being, because they find in themselves, in their muscular effort, in their will the type of every action? Add to this to complete the explanation, the passion for fables and the taste for the marvellous. That diseases of language have some-

times furnished, and do still often furnish, a sort of primitive subject-matter for the human imagination, I willingly grant, but that is all.

From the pen of M. H. FIERENS-GEVAERT we have an *Essai sur l'art contemporain*, a non-didactic work which has the ring of a clarion note amid the turmoil of modern artists. From the pen of M. C. R. C. HERCKENRATH, professor of the French language in a college in Holland, we have *Les problèmes d'esthétique et de morale.* The author who is a distinguished man has thought out anew, and sometimes with an original turn of mind, thoughts which are not new. He makes no pretensions to building up a doctrine, but knows how to recast the old doctrines with grace and sense.

From M. J. MILHAUD we have to note a second edition of the *Essai sur les conditions et les limites de la certitude logique;* from M. ÉMILE BOUTROUX, professor in the Sorbonne, a work *Études d'histoire de la philosophie*, a series of essays having for subjects Socrates, Aristotle, Jacob Böhme, Descartes, Kant, the Scottish philosophy and their influence on French philosophy.[1]

LUCIEN ARRÉAT.

PARIS.

II.

A NOTE FROM ALSACE.

Your correspondence with Père Hyacinthe in the August *Open Court* last, is fresh proof of the difficulty with which even advanced and liberal Catholics absorb monistic ideas. Catholicism is dualism, and the extent to which the so-called "Old Catholics" of Germany are still Catholics is abundantly demonstrated by the latest declaration of Bishop Weber of Bonn. On the other hand, the modern view of the world is gradually gaining more and more ground in Catholic countries, notably in Italy, and next in France, where Fouillée and others of a more or less monistic cast of mind,

[1] All the works mentioned are published by Félix Alcan.

are finding more and more adherents, and the old academic spiritualism is in its last gasps. New life generally is stirring in philosophy in this latter country, and there are indications of a growing interest in our philosophical classics. By the divorce of psychology and metaphysics both sciences have made distinct gains. It is here as in every-day life, where friends so frequently learn to value each other's friendship only after separation.

The *note comique* of the philosophical spring has been struck by JEAN MACE in his *Philosophie de poche*. Mace conjectures that man is not sprung solely from a Simian ancestry, as we have long thought, but that he was engendered in illegitimate marriage and born of an unnatural alliance. Man's ancestor was a bastard of a monkey and a bear. What wonder, then, with such forefathers, that human nature should be so utterly depraved! For Adam was the bear, Mother Eve the monkey. To the former we owe the solidity of our character, to the latter our physical and intellectual mobility and elasticity. As to the respectability of such descent nothing, therefore, can be said. But the persons who have really been disgraced are the bear and the monkey who have suffered themselves to be so far outstripped by us.

What fruitful thoughts Mace's theory of human genesis suggests, and what a flood of light it sheds on universal history. Mankind, particularly European mankind—despite comparative philology and its dogma of the common origin of the chief European races—is doubtless the polygenetic result of various crossings of this kind: the Russian (Slav) has sprung from the monkey and the bear, the Germans from the monkey and the dog, the Romance peoples from the monkey and the cat (presumably the tiger), the Semitic peoples from the monkey and the vampire, and so on. The Russian greed for land, German loyalty, the Romanic vendetta and cruelty to animals, and all the rest, thus find their natural explanations. *Sed ad seria!*

The *clou* to the most recent philosophical literature is HARTMANN'S *Doctrine of Categories*, well known to the readers of *The Monist*. It is still the same old "primordial chance," and "absolute stupidity of the will," or more properly "the absolute non-

sense" of Hartmann's theory of creation. An excellent illustration of the system meanwhile is ARTHUR DREW's book *Das Ich als Grund Problem der Metaphysik.* I was particularly struck here by the author's sharp insistence on the ideality (*sic!*) of the difference between will and idea, by which Hartmannism seems to be turning from the relative dualism of Spinoza to the absolute Monism of Hegel. So, too, the venerable BUECHNER, who has been writing much recently for the *Gegenwart* and the *Magazin*, has appeared with a voluminous work entitled *At the Deathbed of the Century.* Buechner has remained the same old Buechner. Between his naïve materialism and our monism the same difference prevails as between religion and philosophy in Hegel's system. The former merely conceives the unity of existence, the latter comprehends it.

ALFRED WEBER.

STRASSBURG.

BOOK REVIEWS.

DIE CHRONOLOGIE DER ALTCHRISTLICHEN LITTERATUR BIS EUSEBIUS. Von *Adolf Harnack*. Erster Band. Die Chronologie der Litteratur bis Irenäus Leipsic: J. C. Hinrichs. 1897.

There is a decided reaction spreading among the laborers of religious text-criticism,—a reaction not in a bad sense, but in the sense of becoming less suspicious and unfair toward books and traditions. The period of criticism began with doubt, and the doubt of the critics was carried to an extreme which practically left nothing that was genuine and reliable. Baur and his school set the example, and even now the habit of denying the authenticity of every book which is not established beyond the least shadow of a doubt is still the *bon ton* among scholars and critics. Excavations and a deeper study tend to modify this attitude: they do not prove that the various documents we possess are products of fraud, but show on the contrary that they contain ingredients of a much higher age than could be anticipated. In reality there is more faithful tradition, i. e., a careful preservation and a handing down of historical materials in their original form than was ever allowed even by uncritical minds. Professor Harnack, a man known as a fearless investigator, sounds the bugle of retreat and does not hesitate to call it by the right name, *eine rückläufige Bewegung zur Tradition* (p. x). Harnack does not exaggerate when he says that "the oldest literature of the Church in its literary and historical aspect is in all main points and in most of its details truthful and reliable" (p. viii). "In the whole New Testament there is probably one single document only which is pseudonym in the strict sense of the term, viz., the Second Epistle of Peter, and leaving out some gnostic impositions, the number of pseudonym ecclesiastical writings till Irenæus is very limited. . . . Further, the interpolations (as, for instance, in the Pastoral Epistles) are quite harmless, somewhat after the manner of the interpolations in our hymn-books and catechisms of to-day. The Christian sybilline frauds belong to the latter part of the third century."

This reactionary movement, however, does not denote either a reaction or a reversion of science. Quite the contrary. Science, viz., the critical investigations of the historical documents of early Christianity, can make firmer steps since certain facts are better established, and can show doubtful facts in definite connexions and explain their anomalous features.

Harnack's work is of fundamental importance in ecclesiastical history; it is at once exhaustive and handy and condenses an enormous amount of material within the space of 732 pages.

The first book of Introductory Investigation is devoted to Eusebius's chronology, and considerable space is allowed the ancient lists of bishops. Of general interest and quite convincing are Harnack's arguments in favor of fixing Paul's conversion in the year 30, the Apostolic Council in 47, Paul's captivity on Easter 54, and the death of Peter and Paul in 64. The time of the Acts would terminate with 59 and withal the duodecennial sojourn of the apostles at Jerusalem between 30 and 42 can be retained as historical without coming in conflict with the chronology of the Acts. Thus all the important letters of Paul would have to be dated before the year 59, and those of the Pastoral letters which are genuine between 69 and 64. The date of the Revelation of St. John the Divine is fixed in the last years of the Emperor Domitian (93–96), and the Acts must have been written sometime after the year 80, but not later than about the time of the persecution under Domitian.

In a similar way the post-apostolic writings are dated, among them the spurious writings of St. Peter (two letters, the Apocalypse, the Kerygma and the Gospel), the spurious Pastoral letters, the Epistle of James. We must abstain from entering into details, because the questions of chronology are a net-work where we cannot lift out one without feeling obliged to refer to all the others.

In conclusion we would only call attention to Professor Harnack's startling view which is here reasserted, that the Gospel of the Egyptians was for a long time the sole Gospel that was officially used in Egypt and must be recognised as an independent version by the side of the canonical Luke and Matthew; and it was introduced into other Gentile churches. At any rate it was, according to Clement, used in the churches of Rome and regarded as canonical by Soter, a Roman bishop. It will be remembered that Resch differs from Harnack most emphatically. Resch denies that the Gospel of the Egyptians was ever recognised in the Church of Egypt and he contends that its use was limited to encratic sectarians. (See, e. g., Resch's *Agrapha*, p. 317.) Since Harnack is backed by the undeniable statement of Clement, it would be interesting to find that he was after all right. This, of course, would lead to a renewal of the discussion as to the encratic character of early Christianity. Harnack claims that the passage in the Gospel of the Egyptians which would make the coming of the Kingdom dependent on the disappearance of the contrast between the sexes (viz., *ὅταν ἔσται τὰ δύο ἕν, καὶ τὸ ἔξω ὡς τὸ ἔσω, καὶ τὸ ἄρσεν μετὰ τῆς θελείας, οὔτε ἄρσεν οὔτε θῆλυ*) should not be interpreted in an encratic sense, while Resch bases mainly upon this passage his view that the Gospel of the Egyptians is a purely heretical work. κρς.

ELEMENTS OF THE SCIENCE OF RELIGION. Part I. Morphological. Being the Gifford Lectures Delivered Before the University of Edinburgh in 1896. By *C. P. Tiele*, Theol. D.; Litt. D. (Bonon.); Hon. M. R. A. S., etc., Professor

of the History and Philosophy of Religion in the University of Leyden. In two volumes. Vol. I. Edinburgh and London: William Blackwood & Sons. 1897. Pages viii. and 302. Price, seven shillings and sixpence.

Among the works which have been published in connexion with the Lectureships founded by Lord Gifford for the teaching of "Natural Theology" in the Scottish universities, the volume before us by the learned Professor of the History and Philosophy of Religion in the University of Leyden will always occupy a leading position. Dr. Tiele was, some years ago, compelled by circumstances to decline the invitation to fill the Gifford Lectureship, but when a second time he was appointed to the office, on this occasion by the Senate of Edinburgh University, he felt constrained to act differently. We can well understand that his lectures were attended by large audiences, attracted both by the reputation of Professor Tiele, and by the admirable manner in which he handled his subject. The result is the present *Introduction to the Science of Religion*, as he intends this work to be regarded, rather than as a handbook of the subject In another series of lectures he proposes to deal with its ontological aspects, exhibiting the essential and permanent elements in religion, thus ascending to its ultimate source. In the present series the morphological aspects alone are considered, the aim of the lecturer being to establish the principles which govern the development of religion, and to illustrate their operation by reference to the religious systems of various peoples.

Before entering on this task it was necessary to explain what was meant by religion, and also to show the grounds on which it is to be regarded as a science. On the first of these points it will be well to quote Dr. Tiele's own words. He says that he uses the term religion in its ordinary sense, as meaning "the aggregate of all those phenomena which are invariably termed religious, in contradistinction to ethical, æsthetical, political, and others . . . those manifestations of the human mind in words, deeds, customs, and institutions which testify to man's belief in the superhuman, and serve to bring him into relation with it." The science of religion has not to do with the superhuman itself, but only with the manifestations of the human mind which show man's belief in it, and it is this fact which enables us to speak of religion as a science. Here again it is well to quote the lecturer's own words. After referring to the fact that the province of its investigation includes all religions of the civilised and uncivilised world, dead and living, and all religious phenomena which may be observed, he says: "The unity which combines the "multiplicity of these phenomena is the human mind, which reveals itself nowhere "so completely as in these, and whose manifestations, however different the forms "they assume on different planes of development, always spring from the same "source. This unity renders a scientific classification of religions quite as justi-"fiable as that of language." Nevertheless the exact methods of natural science are not applicable to the science of religion, which may rather be termed a philosophy, governed as it is by the deductive method, although it is based on phenomena which have been ascertained inductively through anthropological and historical re-

search. When its study of such phenomena is completed the results are handed over to the central science, "that general philosophy which strives to explain the unity of all creation."

The analogy drawn between language and religion is a proper one; for both are human phenomena and both are subject to growth and decay, it being the office of science to investigate the laws that govern this dual process, a process which operates throughout the whole realm of organic development. What is intended by "development," in relation to religion may be gathered from the statement that morphology is concerned with "the constant changes of form resulting from an ever-progressing evolution." It will be well, however, to consider a little more in detail what meaning is attached by Dr. Tiele to that term as applied to religion. All religions undergo development to some extent, as all have their periods of decline. But religion itself, as distinguished from the forms it assumes, is being constantly developed, a process which is described as the evolution of the religious idea in history, or rather as "the progress of the religious man, or of mankind as religious by nature." This progress is required by the unity of the human mind, the law by which this is governed being also the chief law of religious development. The change is an inward one and it is not concerned with religious externals, such as dogmas, ritual, and observances. These have to be studied to see what is behind them. Religion has to do with man's general disposition and his views of life and the world, which are reflected "in the ideas he forms of his God or gods, and of their relation towards him." Thus religious development is a change in the ideas entertained by man as to his relation towards God, and so far as possible, "he transfers his sentiments and views to his God," and whatever change takes place in them is reflected in his conception of God. To the objection that this is a denial of divine agency, a disguised materialism, Dr. Tiele replies that, to the devout, God reveals Himself "in the orderly and methodical progress of development," and "in the life of religion more perfectly and gloriously than in the caprices of an inscrutable will." This view will meet with ready acceptance from those who recognise the operation of the law of progress in the visible external world. That it operates equally in the world of mind is undoubted, and Dr. Tiele makes use of this fact for the purpose of ascertaining and formulating the law which governs religious development. The law is stated as follows: "All development, apart from the natural capabilities of men and peoples, results from the stimulus given to self-consciousness by contact with a different stage of development, whether higher or lower."

The law of development, as formulated by Dr. Tiele, is based on the principle that intellectual intercourse promotes development, while seclusion and isolation hinder it. Many illustrations of the truth of this principle might be derived from the history of human culture, and it is embodied in two practical rules, which flow from the law of development, when applied to a religion. Of these rules, the second affirms that "religious development is best promoted by the free intercourse of

its most diverse manifestations." The other rule is of a similar character, but it is less general in its application. It is expressed as: "The religion that will attain the highest development is that which is most alive to the genuinely religious elements in other forms." The way in which this rule is stated may lead us to think that it is intended for future application, and when we consider the past history of religion, it seems as though the adherents of one form of religion were loath to admit that any other form possessed genuine religious elements. As to the rule affirming the benefit of free intercourse, it is different, such intercourse being absolutely necessary for the assimilation which Dr. Tiele affirms truly to be the mode by which all development, and therefore religious development, takes place. A striking example of this process may be seen in the relics of the old Teutonic cult which have become incorporated with Christianity, as evidenced by the survival of the ancient festival names Yule, Easter, and Whitsuntide. It is probable that the reception of a new religion is always attended with the assimilation, which is necessarily a gradual process, of various features of the displaced faith. However this may be, we think Dr. Tiele is quite right in rejecting the popular belief that a new religion can be mechanically spread and adopted, that is, without such assimilation, or without a crossing of the old and new religions giving rise to a fresh development. In illustration, he refers particularly to the spread of Mazdaism throughout the Persian empire, the facts connected with which show, that, instead of a lower religion being discarded and replaced by a higher religion, "the existing religion of Iran assimilated as much as it could from the Zarathushtrian doctrine, and thus, although it mutilated the doctrine and applied it very imperfectly, was itself reformed and proceeded to develop itself in this direction."

We have devoted so much space to a consideration of the principles which govern religious development, that we can give but a short sketch of Dr. Tiele's conclusions as to the several *steps* of such development and the *directions* in which it has taken place. The former constitutes religious morphology and has to do with the forms under which religion exists, while the latter has reference to the lines along which religious development takes place. Dr. Tiele adheres to his earlier division of the forms of religion into the two chief categories of *nature* and *ethical* religions. These are sharply distinguished, the former being devoid of doctrinal teaching such as appears in the ethical religions as revealed truth. Nature religions originate in animism, with which fetishism, totemism, and idolatry in general are connected, through spiritism the belief that spirits can wander about from object to object at will—to organised polytheism. This exhibits two distinct steps of development, the therianthropic, in which the gods assume animal forms, and the anthropical. The latter shows the beginning of an ethical movement, in the attempt at a purification of the world of the gods, but it did not lead to the establishment of an ethical religion, as this required the substitution of a spiritual and personal God for the nature gods.

Among the causes which determine the directions taken by religious develop-

ment, Dr. Tiele seems inclined to give the first place to race, comparing the development of religion to that of language, the study of which has yielded a classification of peoples. The study of religions has led to a similar result, showing that religion has developed in different directions with the Aryans and with the Semites, the former being *theanthropic* and the latter *theocratic*—here the gulf between the human and the divine becoming widened, instead of being bridged over and man becoming God. Religious development requires that these two streams shall unite and thus give rise, through reconciliation of opposing ideas to a higher form of religion in which opposing tendencies are harmonised. Such Dr. Tiele thinks is the case with Christianity, the appearance of which inaugurated an entirely new epoch in the development of religion. The two-fold process of ever-increasing differentiation combined with efforts at reconciliation and unity, is observable in the general development of the human mind, as well as in the sphere of religion, and here we have the key to Dr. Tiele's theory, which is that of evolution. Any other position is now untenable, and we know of no other work on the subject in which the theory of religious development is so ably presented as that here reviewed.

C. S. W.

A History of Christianity in the Apostolic Age. By *Arthur Cushman McGiffert*, Ph.D., D.D., Washburn Professor of Church History in the Union Theological Seminary, New York. New York: Charles Scribner's Sons. 1897. Pages, 681. Price, $2.50.

This work is the fifth volume of the International Theological Library, edited by Dr. Charles A. Briggs of the Union Theological Seminary of New York, and Dr. Stewart D. F. Salmond of the Free Church College at Aberdeen. The enterprise is praiseworthy and a good symptom of the scientific spirit of the age; it proposes to serve the purpose of theological science by offering text-books to students of theology and to render theological questions, as scientific questions, accessible also to students of other departments. The programme is promising, and we mention among the books in preparation the large *Theological Encyclopædia*, by the American Editor; *Old Testament History*, by Prof. Henry Preserved Smith; *The New Testament Literature*, by the European Editor; *Comparative Religion*, by Fairbairn of Oxford; and *Philosophy of Religion*, by Flint of Edinburgh, etc.

Professor McGiffert sketches in a few pages (1–35) the origin of Christianity, limiting himself to Judaism, John the Baptist, and, above all, Jesus, but omitting the question of the influences which formed this extraordinary personality. The second chapter treats of Primitive Jewish Christianity and the conflict between the Christians and the Jews (pp. 36–93). The Christianity of Paul and the work of Paul (pp. 151–439) constitute the most important part of the book, at which the author apparently has labored with great devotion. The fifth chapter, on the Christianity of the Church at large (pp. 440–545), touches only lightly upon the problems of the Four Gospels, and are mainly devoted to the writings that go under

the names of John, Peter, and Paul; and the last chapter, on the development of the Church (pp. 546–672), pictures the origin of its institutions under James in Jerusalem, under Peter in Rome, under John in Asia. Our author, in contrast to the critics of the New Testament, believes in the genuineness of the Epistle of St. Peter and accepts the tradition that the John of Asia is actually the Apostle John.

The book is upon the whole very conservative, which may be the main reason why the author has limited himself to the traditional sources of Church history and does not even seem to have thought of utilising the rich material which is offered by a comparison of Christianity with pre-Christian Religions, which promises to throw much light upon the faith of the apostolic age. The influence of non-Christian religions was not direct but indirect, and can be traced in the Apocrapha of the Old Testament, especially the wisdom literature and the various apocalypses from Daniel down to the Apocalypse of Enoch, even including the Revelation of St. John the Divine. But we must not prescribe to an author the subject on which he should write, if he only (as is here the case) writes well on the subjects which he chooses.

The daily papers bring the information that the author will be subjected to a heresy trial, and hint at the probability of his meeting with the same fate as Dr. Briggs. We hope that the statement is premature for if criticism in this mild dose be heresy, then science must be blasphemy; and woe to that Church which deliberately would expel every man who dares to be a thinker! P. C.

SECHZIG UPANISHAD'S DES VEDA. Aus dem Sanskrit übersetzt. Und mit Einleitungen und Anmerkungen versehen. Von *Dr. Paul Deussen*, Professor an der Universität Kiel. Leipsic: F. A. Brockhaus. 1897. Pages, 920.

The Upanishads are religio-philosophical discussions which mark the awakening of a spirit of inquiry in India and form a period of transition from the religion of tradition to the religion of independent thought. It is the age of Vedantism, i. e., of aspirations which seek to fathom the aim or end of the Vedas and discover the Brahm, i. e., the All-soul of the world in man's own self, which is called the âtman. If the Vedas are comparable to the Old Testament and the Buddhist Canon to the New Testament, the Upanishads represent the period of transition which would render them analogous to the wisdom literature and other apocryphal writing of the Jews. Paul Deussen, however, whose philosophical standpoint is a modernised Vedantism, naturally compares the Upanishads to the New Testament itself, which would relegate the further evolution of Buddhism to a revolutionary movement undermining the fundamental notions of religious philosophy by denying the existence of an âtman. But whatever views Deussen may entertain, and whether or not we agree with him in metaphysics, we must be grateful to him for the enthusiasm which has prompted him to bring out a collection of translations of Upanishads which is by far the completest of all. Max Müller, in *The Sacred Books of the East*, has published twelve Upanishads in two volumes, and here we have

sixty Upanishads most of which have never been translated before while none of the Upanishads with which we are familiar through former translations have been omitted. The introductory notes to each Upanishad have the advantage of conciseness and the translations themselves are at once clear and dignified. κρς.

INFALLIBLE LOGIC. A Visible and Automatic System of Reasoning. By *Thomas D. Hawley*, of the Chicago Bar. Lansing, Mich.: Robt. Smith Printing Co. Pages, 659.

This is a book of rising six hundred pages, bound in sheep, prepared "for the use of lawyers, ministers, teachers, and for every one who is interested in the *art* (italics ours) of reasoning."

The logic on behalf of which the author of this book has been moved to take the rôle of an expositor is a system of dealings with terms and their negatives respectively. The terms of any set of premises and their negatives are to be combined in every possible way; then the combinations are to be examined and all those rejected that are inconsistent with any one of the premises. The remaining combinations are to be regarded as so many conclusions.

As a convenience for this process the author has invented his Reasoning Frame a system of rectangular diagrams rectangularly divided after the fashion of a multiplication table.

The author tells us that his method was discovered by him in March 1895, less than two years before the publication of his work.

The work is unlike, and yet like, the logic-books of the prevailing style, that is to say, such as are written by that school of logicians who while writing voluminously upon logic, ever and anon will fall to inquiring of one another, What is it anyway that we are writing about? There are no doubt many of such that will think and speak of this work disparagingly. Any respectable logic, they will say, ought to have its doctrine of terms, its doctrine of propositions, Aristotelian (with its paralogisms) or Thompsonian, its system of syllogisms and its discourse on fallacies, but here is a book that pretends to grind out conclusions by a mere mechanical process. Of course it must be a book that has usurped its title.

Let them then show wherein their own treatises have a better right to the title of Logic and wherein the same are more useful or more promising than is this one. It has been said, "If one were to inspect a fair proportion of the more extensive "recent works on Logic, the conclusions drawn would have to be that, while the "matters treated show a slight similarity, the diversity is so great that it would be "impossible to select by comparison and criticism any certain body of theorems "and methods and assign to them the title of Logic. Looking at the chaotic state "of logical text-books, one would be inclined to say that there does not exist any-"where a recognised currently received body of speculations to which the title of "logic can be unambiguously assigned."

If this be true the title of this book is no more a usurpation than are the titles of most of the other logic-books.

Logic should mean the *science* of reasoning, that is to say, there is occasion, opportunity, and much good material for a just and adequate account of and report upon that mental operation that is called reasoning. If such a science were not called logic what then would be an apt name for it?

Such a science would have for its leading trait a well-conceived doctrine of what reasoning consists in. It would give an illuminating account of that important operation and would show how and by what warrant it is that we pass from one or more premises to our couclusions. It would not depend upon a judiciously selected array of "elegant extracts" as a plausible means to give it a tenure to which it was not justly entitled, but would scorn to invite any esteem that any the most unsparing competent criticism could take from it.

It would not remain content and conceited in a development arrested at the puerile stage, but would after being well conceived, well delivered, and well formed through its early history show a health, vigor, and growing nature that would promise a maturity fit to explain the reasonings of mature minds.

If we stop and go no farther it is no explanation of any consequence to be shown how we are reasoning soundly when we infer that we shall die because all men die. Such inferences as examples of the *rudiments* of reasoning are of importance, but as examples of reasoning in its general scope they are precisely on a par with the arithmetical theorem that two and two make four. Jones, a statesman, wishes to get Smith, another statesman, to support his measure. Smith is under great obligations to Robinson, and Robinson is very friendly to Jones. So Jones reasons thus: I can persuade Robinson, and Robinson can command Smith, *ergo* I can control Smith. This is a type of reasoning not less demonstrative in its nature than simple syllogism and used a thousand times more frequently. And yet the ordinary logic-books have not a word to say in explanation of it.

Such a science as the one we have specified would also be a fund of diversified information relating to the various *arts* of reasoning. For while the science of reasoning is in its nature single, the *arts* of reasoning are various. Any *art* of reasoning depends largely for its features and merits upon the medium it sees fit to take or invent. We do our reasoning in and about accounts and many other things by means of the Arabic digits, the Indian cipher, and the arithmetical algorism pertaining thereto. If we tried to perform the same reasonings by means of the Roman or the Greek arithmetical notation or by means of the syllogistic figures and moods we should very soon find out how important a rôle is played in such kinds of inference by the mere medium employed. In like manner, so it is with a large range of other reasonings for which that medium called algebra has been invented. We ought to see even in the case of arithmetic that what we really do is first to translate our problem from ordinary language into another language, viz., arithmetic, then perform our reasoning in and by arithmetic until we reach our conclusion and

finally we translate our conclusion back into ordinary language. But arithmetic has become so engrafted into, or rather upon, ordinary language that the fact that we really use a medium for our reasoning, materially different from ordinary language is not readily perceived. It is, however, plain enough to be seen when algebra is used. The fact that algebra and arithmetic are only fit for certain limited ranges of reasoning is a circumstance of no moment whatever to the philosophy of the subject.

Ordinary logic-books labor under the tacit assumption that ordinary language is the only medium available for any general art of reasoning. It seems never to have occurred to any of the authors of such books that it would be worth while to inquire and find out whether it would not be possible to elaborate a medium for reasoning in general, analogous to algebra and such, that as in algebra we could translate our premises into the language of that medium, perform with advantage our reasonings to conclusions in that medium and then translate our conclusions back again into ordinary language. Quite contrariwise, the authors of ordinary logic-books of recent delivery while aware in a general way that divers and sundry persons have severally and actually worked out and submitted for approval each his own scheme and example for such a medium, have never paid to such schemes and examples any sort of competent attention preferring to assume an innuendal logical omniscience and follow the beaten track of pretentious inconsequence.

Those, however, who have thought it worth while to prosecute the inquiry above mentioned have found out that there is not one single art, but many arts of reasoning, and that of the various arts of reasoning possible, it is quite a question which one, if any single one, would on the whole prove to be the best fitted for reasoning in general. They see also that it may turn out that one *art* and the medium and algorism appropriate to the same will prove best adapted for one range of inferences, while another art and its medium and algorism will prove best for another range.

By inquiring into the various *arts* of reasoning, their media and algorisms respectively, there ensues an access of information regarding reasoning in general, so that it can be seen that a genuine *science* of reasoning can reasonably be expected after a due measure of such study. Hence the book under review is well worthy of attention and study. FRANCIS C. RUSSELL.

THE PSYCHOLOGY OF SUGGESTION. A Research into the Subconscious Nature of Man and Society. By *Boris Sidis*, M. A., Ph. D., Associate in Psychology at the Pathological Institute of the New York State Hospital. With an Introduction by *Prof. William James*, of Harvard University. New York: D. Appleton & Co. 1898. Pages, x, 386.

The indorsement by so high an authority on psychological subjects as Professor James will be sure to attract attention to this work, although it makes no reference to the phenomena of so-called Spiritualism with which his name is sometimes

associated. Dr. Sidis does, however, deal with certain phenomena which are sometimes claimed by the adherents of that semi-cult, but he explains them without calling in the aid of spirits, regarding them as incidentals of the existence in man of a subconscious self in addition to the primary self of the ordinary conscious life. He refers to certain well-known cases of double and treble "personality" in proof of that existence, and as evidence that "the subconscious is not a mere unconscious physiological automatism, but a consciousness, a self in possession of memory, and even intelligence, and that this hidden intelligence may even possess some degree of self-consciousness." The facts cited by Dr. Sidis undoubtedly prove the existence, under abnormal environments at least, of a something which, for a period of shorter or longer duration, usurps the place of the primary personality.

The physiology of the subconscious factor is illustrated by an ingenious "plan of the organisation of the brain cells into groups, systems, communities, clusters, and constellations." By reference to this plan we can understand what is meant by the retraction of the processes of the brain cells, which Dr. Sidis supposes to be the cause of the dissociations that lie at the root of double personality, subliminal consciousness and related phenomena. As to the *character* of subconscious self, it is interesting to note that it is stupid, credulous, devoid of any sense of the true and rational, and, when cut off from the waking person, of all morality and conscience. It is, says Dr. Sidis, "essentially a brutal self," and has no true personality. Its chief characteristics would seem to be its great plasticity and suggestibility, and it is the seat of all the phenomena which come under the head of the psychology of suggestion. The experiments made by Dr. Sidis on this point are of great importance, and confirm the opinions that suggestibility is not confined to abnormal subjects, and that "the primary self alone possesses true personality, will, and self-control." How far they will lead to the solution of the problem of personality, Professor James appears to be doubtful, but we think the third part of the work, which treats of the suggestibility of crowds, throws considerable light on it. Dr. Sidis speaks of "the gregarious, the subpersonal, uncritical, social self, the mob self, and the suggestible subconscious self," as identical. It is, indeed, the social and hereditary element, representative of the past, which every one possesses in common, but which is the soil out of which are developed their distinctive personalities,—in other words, the *individuality*, which M. Ribot in his *Diseases of Personality* identifies with the organic factor. In this direction must be sought the solution of the problem of personality, and Dr. Sidis's work contains much that has an essential bearing on the subject. C. STANILAND WAKE.

NATURAL CAUSES AND SUPERNATURAL SEEMINGS. By *Henry Maudsley*, M. D. Third Edition. Revised and Rewritten. London: Kegan Paul, Trench, Trübner & Co. 1897. Pages xi and 324.

The fact of this work having reached a third edition is evidence of the estimation in which it is held. In its present form it is not a mere reprint. The text of

the work has been modified for the purpose of presenting the argument more perfectly, and thus its value has been enhanced. Even those who do not accept Dr. Maudsley's conclusions must, if fair minded, acknowledge that his method is good. It is essentially critical, and criticism of opinions not established on the immediate basis of truth is always beneficial if conducted in the right spirit. Of course Dr. Maudsley's argument is directed against the belief in the existence of the supernatural, which belief he asserts to be due to the imperfect action of the human mind, and it deals with the chief classes of errors comprised under the heads of (1) natural operations of the mind, (2) operations of the unsound mind, and (3) the extraordinary state of mind which is called spiritual. It is a curious fact that Dr. Maudsley speaks of the several causes of error in the thinking thus classified as having led to "wrong theories of the supernatural," as though there were or might be a right theory. This may be a slip, as throughout his whole work he insists on the nonexistence of the supernatural, and yet in places he refers to the existence of a cosmic power which his opponents may regard as differing but little from that which he seeks to discredit.

The fact is that Dr. Maudsley's argument is directed, practically, against the use of the term "supernatural," rather than against the actuality of what the term denotes. Let the bounds of nature be extended, as they should be, so as to embrace the universe of things, and the existence of that which the human mind has usually regarded as supernatural is not really affected. Man measures the activities of nature by himself, and whatever he cannot understand is to him beyond nature. Hence he peoples the universe with beings of superhuman power and attributes, whose authority finally become merged into that of a single deity, who is the autocratic ruler of heaven and earth. Those who object to the existence of the "supernatural" usually have in view such superhuman beings. But their exclusion would not destroy the cosmical realities to which man applied that term, as being outside of nature as he understood it; just as the destruction of systems of theology need not be accompanied by that of religion, which "has always been at work in the processes of what men are agreed to call human progress." This is a necessary inference from one of the two elementary truths which Dr. Maudsley draws special attention to in his Preface, the other being that the source of human progress, individual or social, must be sought, not in intellect or reason, but in "the deep, permanent impulses of feeling which incite men to live and to grow into larger life." This larger life is the realisation of the altruistic sentiment which sees in humanity at large the extension of oneself. We must remember, however, that the spread of the branches of the tree is but the visible half of its growth. The greater the spread of the tree's branches, the deeper is the ground penetrated by its roots. And so it is with man. The wider his human sympathies the deeper become his cosmic associations; and what was before supernatural is found to be merely an aspect of the nature of which man himself forms part.

We have preferred to dwell on this feature of the subject rather than to exam-

ine Dr. Maudsley's special conclusions. That most of the phenomena to which he refers are traceable to some abnormal condition of the organism, where they are not due to defective observation, is certain; but it is no less true that their real origin has yet to be discovered. With reference to the phenomena of Theopneusticism which occupy the third part of the work, the fact that the "spiritual intoxication" they exhibit can be induced by the use of drugs, shows that they have an organic basis. Dr. Maudsley remarks that to admit the validity of the methods of ecstatic revelation side by side with the positive method of knowing proper to the natural understanding is to divide the mental being in two, and so to render real unity of thought and feeling impossible. The difficulty is, however, that we know so little of the nature of mental action that we cannot yet assign the psychological value of what appear to be abnormal states. If the "unknown and ineffable" something of which Dr. Maudsley speaks, when referring to the opposition between atheism and theism, really exists, may it not be the source of the "spiritual" phenomena of which he treats? They are not always attended with weakness of moral fibre any more than genius is always accompanied by incipient insanity. And thus it may be that while the author so ably analyses the sources of error, the truths may be found where he least suspects it.

C. STANILAND WAKE.

AFFIRMATIONS. By *Havelock Ellis*. London: Walter Scott, Limited. 1898. Pages vii and 248. Price, 6 shillings.

In this book we have a study of certain facts of life, as they appear in literature or are suggested by it, which the author thinks it advisable to emphasise, now that the "yet unwashed toilers" of the present century have risen up, "in half-intoxicated jubilation, over the triumphs of their own little epoch, well assured that there never was such an age or such a race since the world began." It is the object of *Affirmations* to show the falsity of this notion by insisting on the eternal verities of life, especially under their questionable aspects. Mr. Ellis's subjects are well chosen for this purpose, and it is fitting that he should take for his opening essay the philosophy of Nietzsche, who may be regarded either as a survival from the pre-Christian era or as the harbinger of the downfall of Christianity, according to what the ensuing century brings forth. This essay occupies more than one-third of the entire work, and is a careful study of the unfortunate philosopher's ideas and of the influences which affected him. Its perusal confirms the theory that genius and insanity may not be far apart, and shows that from an early period the final catastrophe was foreshadowed. This does not necessarily, however, affect the value of this philosopher's teaching, the aim of which was to remodel the moral world by the establishment of "master morality" in the place of the "slave morality" of Christianity. Mr. Ellis explains Nietzsche's theory, which on the surface appears to be morally retrogressive, as being "simply a vigorous hatred of all dreaming that tends to depreciate the value of life, and a vivid sense that man himself is the *ens realissimum*."

This view of morality is very well so long as man is guided in his conduct by lofty principles, as was Nietzsche himself, notwithstanding some of his questionable utterances. But men usually live on a lower plane, and if they feel that nothing is forbidden their conduct will display the influence of sensuousness rather than that of reason. Such was the case with most of the personages whom Mr. Ellis has chosen to illustrate his own opinions. There are, besides Zola, Casanova, the professional libertine of the eighteenth century, whose *Mémoires* we are told read like a fairy tale, and Huysmans, the modern French novelist, whose æstheticism is of a high order, but who has so profound a sense of smell that he is able to devote a whole essay to defining and differentiating "the odors of feminine armpits"! The author of *Affirmations* says rightly that he has a predilection for the questionable aspects of his subjects. His last study, entitled "St. Francis and Others," is concerned largely with the various phases of purity, which he judges from the standpoint of the saying, "to the pure all things are pure." Unfortunately few persons attain to the degree of moral strength here implied, and admirable as Mr. Ellis's work is from a literary standpoint, we think it comes within the category he himself adopts when he says "certain books possess a value that is in the ratio of the spiritual vigor of those who use them, acting as a tonic to the strong, still further dissolving and enfeebling the weakness of the weak." C. S. WAKE.

STUDIES IN PSYCHICAL RESEARCH. By *Frank Podmore, M. A.* New York and London: G. P. Putnam's Sons. 1897. Pages, 458. Price, $2.00.

The present volume is an outgrowth of the work of the Society for Psychical Research, in the *Proceedings* of which body some of its articles have appeared. The titles of the Chapters are as follows: (1) Spiritualism as a Popular Movement; (2) The Physical Phenomena of Spiritualism; (3) Spiritualism and Psychical Research; (4) Poltergeists; (5) Madame Blavatsky and Theosophy; (6) Experimental Thought Transference; (7) Telepathic Hallucinations; (8) Ghosts; (9) Haunted Houses; (10) Premonitions and Previsions; (11) Secondary Consciousness; (12) Impersonation, Obsession, Clairvoyance. Mr. Podmore's views may be characterised as moderate. We give one example of his opinions: "More than one view "is possible of the general effect of the evidence. To some of my colleagues, it "seems to indicate that thought can influence thought, untrammelled by the ma- "chinery of sense organs and ethereal undulations; that the human soul can, while "still attached to the body, transcend the limits of space and time and the laws of "the physical world; and can after the death of the body prevail to make its pres- "ence known to us here. To my thinking, the evidence is too slender and too "ambiguous to bear the weight of such tremendous issues; and though I hold that "there are grounds sufficient to justify telepathy as a working hypothesis, the proof "of its transcendental nature is still wanting." The attitude of the book generally is in harmony with the declarations and spirit of the Society for Psychical Research,

the aim of which has always been to ascertain "the facts of the case," and will, from the very nature of its subject, find many curious and eager readers. *ρ.*

STUDIES IN THE PSYCHOLOGY OF SEX. Vol. I. Sexual Inversion. By *Havelock Ellis*. London: The University Press. Pages, xvii+204. Price, $1.75.

Mr. Havelock Ellis has approached a very delicate subject in the present work. Yet, as he says, "these things concern every one; the study of these things con-"cerns the physiologist, the psychologist, the moralist. We want to get into pos-"session of the actual facts, and from the investigation of the facts we want to as-"certain what is normal and what is abnormal, from the point of view of physiology "and psychology. We want to know what is naturally lawful under the various "sexual chances that may befall man, not as the born child of sin, but as a natur-"ally social animal, what is a venial sin against nature, what a mortal sin against "nature."

He adds further: "I had not at first proposed to devote a whole volume to "sexual inversion. It may even be that I was inclined to slur it over as an un-"pleasant subject, and one that it was not wise to enlarge on. But I found in time "that several persons for whom I felt respect and admiration were the congenital "subjects of this abnormality. At the same time I realised that in England, more "than in any other country, the law and public opinion combine to place a heavy "penal burden and a severe social stigma on the manifestations of an instinct "which to these persons who possess it frequently appears natural and normal. It "was clear, therefore, that the matter was in special need of elucidation and dis-"cussion."

There are seven chapters: (1) An Introduction on the History of Homosexuality; (2) The Study of Sexual Inversion; (3) Sexual Inversion in Men; (4) Sexual Inversion in Women; (5) The Nature of Sexual Inversion; (6) The Theory of Sexual Inversion; (7) Conclusions. Dr. Ellis's treatment of his material is similar to that of Moll, Kraftt-Ebing, Westphal, etc., but is not limited to the re-elaboration of their results. He has collected new data, and undoubtedly done a service to pathological psychology. Dr. Flynt has added a curious chapter on "Homosexuality Among Tramps."

METHODOLOGISCHE BEITRÄGE ZU PSYCHOPHYSISCHEN MESSUNGEN. (Auf experimenteller Grundlage.) Von *Dr. Arthur Wreschner*. Leipsic: Johann Ambrosius Barth. 1898. Pages, 238. Price, M. 7.

Dr. Wreschner offers us in this book a record and a development of a long series of experiments on the measurement of sensations due to the pressure of weights. Though the starting-point of modern experimental psychology, this branch, he claims, has, owing to numerous disturbing circumstances, been greatly neglected. For example, the weight of the lifting arm is an error which must be eliminated, the muscles which perform the lifting must be discriminated, and further, the vari-

ous resistances which the various positions of the arm induce, must be considered. The history of the experiments extends from Weber, Fechner, and Müller through Hering, Biedermann, Bastelberger, Merkel, Leyden, Goldschneider down to the present time. Dr. Wreschner's experiments were conducted in the laboratory of Prof. Ebbinghaus in Berlin. Special instruments were constructed for avoiding the disturbing factors, many new devices were conceived for correcting the errors of time, and the results have been developed in large compass by the aid of many tables. There are five chapters, namely: (1) Introduction; (2) A Discussion of the Judgments "Greater," "Equal," and "Less"; (3) The Error of Time; (4) The Effects of Practice; and (5) The Influence of the Size of the Weights Adopted as Standard. The work is one of the series of *Schriften der Gesellschaft für Psychologische Forschung* (being Heft II., III. Sammlung) and naturally is of interest to special psychologists only. K.

NATÜRLICHE SCHÖPFUNGS-GESCHICHTE. Gemeinverständliche, wissenschaftliche Vorträge über die Entwickelungs-Lehre. Von *Ernst Haeckel*, Professor an der Universität Jena. Neunte umgearbeitete Auflage. Erster Theil: Allgemeine Entwickelungslehre. (Transformismus und Darwinismus.) Zweiter Theil: Allgemeine Stammesgeschichte. (Phylogenie und Anthropogenie.) Berlin: George Reimer. 1898.

The ninth revised German edition of Professor Haeckel's splendid work on the *Natural History of Creation* has been enriched by the addition of a large number of excellent illustrations and many new tables. Not least among the illustrations are a handsome heliogravure of Gabriel Max's famous painting *The Pithecanthropos alalus*, which was especially painted for Professor Haeckel, and a fine portrait of Professor Haeckel himself as frontispiece. Furthermore, many changes have been made in the parts treating of the systematisation and the phylogeny of organic forms. Professor Haeckel never omits to apply practically his world-view to the crying questions of the day, and he has given us anew in the preface to this, his last work, a picture of the moral and political tendencies of the end of the nineteenth century, and particularly of the grave reaction which is taking place in his own country. We trust that the work in its present new form will not fail in the beneficent influence which its predecessors have exerted. μ.

ON ORTHOGENESIS AND THE IMPOTENCE OF NATURAL SELECTION IN SPECIES-FORMATION. By *Th. Eimer*. Religion of Science Library, No. 29. Chicago: The Open Court Publishing Co. London: Kegan Paul, Trench, Trübner & Co. 1898. Pages, 56. Price, 25 cents.

The present booklet gives an accurate and comprehensive epitome of Eimer's doctrine of evolution and constitutes the gist of his large German work *Orthogenesis bei Schmetterlingen* which has just appeared. Nineteen of the most typical and illustrative cuts from the latter book have been incorporated in the present

pamphlet, so that one can readily follow here in broad outlines the specific facts which Professor Eimer has adduced in demonstration of his views. Eimer's theory rests, as is well known, on his doctrine of *organic growth*, which asserts that "transmutation takes place exactly as does the growth of any single individual "being, through the transmission of acquired characters, that is, through the given "constitution of the animal and the effects of outward influences." The fundamental proposition of the theory is that of the *orthogenetic* or *definite variation* of species, which are declared to be "essentially nothing else than stages of evolution interrupted at definite points in the developmental path, a *standstill*," which the author calls "*genepistasis*, that is, cessation of transformation on the part of a given kindred or generation (from γένος and ἐπιστάσις)." The discussions are directed specially against the position of Weismann. Professor Eimer's theories are closely allied to the work of American inquirers of the Neo-Lamarckian school and consequently will be received with interest. ρ.

AFRICA: ANTROPOLOGIA DELLA STIRPE CAMITICA (SPECIE EURAFRICANA). By *Giuseppe Sergi*. Turin: Bocca Brothers. Pages, xv+426.

This volume is number one of a *Biblioteca di Scienze Moderne* which the editors propose to issue in two series: the first in octavo form to comprehend only works of the most strictly scientific character, thus furnishing a medium for the publication of researches of Italian scientists whose work might not otherwise find its way to public notice; the second to consist of small 16mo. volumes containing matter of a somewhat popular nature. It is to the first of these series that the work before us belongs. Typographically it represents a high standard. One hundred and eighteen illustrations and a chart showing the geographical distribution of the peoples of Camitic or Hamitic stock in Africa add interest to its pages. Professor Sergi announces that it is only the first part of his treatment of the subject. In a subsequent book he will consider the Camitic stock "diffused and established in Europe from time immemorial, anterior to history and to traditions" (preface). He here treats exhaustively of the physical characteristics of the eastern and northern branches of the Camitic stock, the eastern branch including the Egyptians, the Ethiopians, the Nubians, Abyssinians, and other peoples; and the northern branch, the Lybians, Berbers, Tebuans, Fulbians, and the inhabitants of the Canary islands.

In this book Professor Sergi displays a method worthy of imitation in all such researches. Like some of the laity he finds little satisfaction in the attempts to classify human races by color of skin, hair or eyes, a cross-section of the hair, stature, cephalic index, facial form, and such like characteristics, declaring that the employment of such criteria produces a chaos, and is not a true method of classification. The continued use of such a method warrants the statement, he thinks, that "in spite of the progress of the natural sciences, systematic anthropology has not advanced a single step" (preface). What then is the method he pro-

poses to follow? I shall answer by quoting his words: "It is necessary, it seems to me, to begin over, as if up to the present no classification existed, and with a simple and rational method: to try to find out, that is, among the different physical characteristics which are constant and which are variable; to examine by means of the constant characteristics a human group without any regard to its history and its culture; to establish the characteristics which analysis has revealed, and to follow them in other human groups in geographical distribution, without preoccupying ourselves too much with secondary characteristics and with the variations which occur in them; to explain, in fine, the causes of these variations, and to determine the human variety" (preface). As to constant characteristics Professor Sergi maintains here as elsewhere that they are to be found in cranial forms. Neither the influence of external physical conditions nor the mingling of races has caused these forms to vary. Not only the forms but also the average volume of the cranium has remained from the earliest times immutable and unaltered (p. 7). Whether this is correct or not there will doubtless be some dispute. Nevertheless, the method applied is commendable.

The first problems, then, for the anthropologist to grapple with are of a general nature and may be stated as follows:

1. "Are there any established and persistent fundamental physical characteristics of a race through all time and in spite of the infiltration of different ethnical elements?

2. "Are there alterations of these physical characteristics on account of exterior physical conditions or of mixing, which may produce a hybrid stock?

3. "May it be admitted that a race, numerous and distributed over an extended area, under diverse physical conditions, may be separated into different groups which preserve the fundamental physical features unaltered, while they assume variations which distinguish and separate them?

These questions being answered, Professor Sergi is ready to consider the particular branch of the human race known as the Camitic. The following questions then arise:

1. "What are the physical characteristics of the Camitic race ancient and modern?

2. "What is the area of its distribution, and is the actual population of a given region Camitic or descendents of the ancient and primitive race?

3. "What stock, or race, or variety constitutes the Camitic, and into what and how many groups is it divided?" (See pp. 3–4.)

In answering these questions a mass of anthropological facts are exhibited that is astonishing. Not only so, but in the treatment of each people a *résumé* of the opinions of other writers makes the book a compendium of information in regard to what has been said by reputable anthropologists concerning the people of the dark continent.

Professor Sergi arrives at the conclusion that the people he studies constitute

a species, which species he denominates *Eurafricano*, using the word, however, in a sense different from that adopted by Keane and Brinton. Egyptians, Abyssinians, and Berbers are, then, according to this conclusion, of the same race as Italians, Greeks, and Spaniards. All have had a common centre of origin. Doubtless this kinship will be disclaimed. But the effort to do so may lead to further light upon the ever-interesting problem of the origin of the human race.

I. W. HOWERTH.

ON CHINESE PHILOSOPHY. By *Dr. Paul Carus*. Religion of Science Library, No. 30. Pages, 60+. Chicago: The Open Court Publishing Co. London: Kegan Paul, Trench, Trübner & Co. 1898. Price, 25 cents.

Dr. Carus's *Chinese Philosophy* treats of the development of the main characteristic features of Chinese thought, especially with reference to the *Kwa*, or *Ying* and *Yang*, system of permutations. The subject is discussed in all its philosophical bearings, the various theories to which it has given rise are dealt with, and notably Leibnitz's ingenious attempt to explain it by the binary system of numbers is thoroughly ventilated. The systems are considered as an outgrowth of the Chinese national character and are in turn made to explain much of the subsequent development of that character. There is much history, and also numerous philosophical and ethical reflexions woven into the texture of the argument, and since accounts of Chinese philosophy generally are rare, Dr. Carus's booklet will be welcome to all who would gain a glimpse into this singular and unique manifestation of the human mind. The brochure is illustrated with many diagrams and figures and is adorned with Chinese characters. *p.*

TRAITÉ ÉLÉMENTAIRE DE MÉCANIQUE CHIMIQUE FONDÉE SUR LA THERMODYNAMIQUE. Par *P. Duhem*, Professeur de physique théorique à la faculté des science de Bordeaux. Tome II. Vaporisation et modifications analogues. Continuité entre l'état liquide et l'état gazeux. Dissociation des gaz parfaits. Paris: A. Hermann. 1898. Pages, 378. Price, 12 francs.

The second volume of Duhem's *Traité Elémentaire de Mécanique Chimique* completes the work. The three books, of which the present volume consists, deal: (1) with vaporisation and analogous modifications, embracing saturated vapors, the theory of ebullition, fusion and allotropic modifications, dissociation, etc.; (2) with the continuity between the liquid and the gaseous states, embracing a discussion of critical points, the principle of James Thomson and the theory of Maxwell, the equation of compressibility of fluids, the specific heats of fluids, the adiabatic transformations of saturated vapors; and (3) with dissociation in systems containing mixtures of perfect gases, including the laws relative to the specific volumes and specific heats of perfect gases, mixtures of perfect gases, dissociation in homogeneous gaseous systems, density of a dissociable gaseous combination, specific heats of a dissociable gaseous combination, etc. The author, M. P. Duhem, is Professor of

theoretical physics in the University of Bordeaux, and by his numerous memoirs, in which he has applied the engines of analysis to the solution of real questions, has shown himself to be one of the first mathematical physicists of Europe. He is the author of a course of mathematical physics in two volumes, of treatises on the thermodynamic potential, hydrodynamics, elasticity, acoustics, of lectures on electricity and magnetism, and of an introduction to chemical mechanics. In the present work Professor Duhem has sought to give a rigid and purely analytical presentation of thermodynamics, in so far as the theories of that science bear upon the elucidation of chemical processes. The first volume noticed in Vol. VII. of *The Monist*, page 467, has been well received by the world of science, and doubtless the present volume which reaches the heart of the subject will be accorded a still more favorable reception. The publishers have given to it the same attractive form in point of mathematical typography, and a list of the errata in the first volume has been added. μκρκ.

Das Philosophische in Humes Geschichte von England. Von *Heinrich Goebel, Dr. phil.* Marburg: N. G. Elwert. 1897. Pages, 114.

Although the author limits his expositions to a critical review of David Hume's history of England, the pamphlet may as well be regarded as a criticism of the eighteenth century Rationalism from the standpoint of to-day. The inconsistencies which Goebel points out in Hume's views of civilisation, of the purport of history, of the nature of the state, of religion and the principles of morality, hold good with slight modifications almost for every one of the *esprits forts* of the eighteenth century. Hume is one of the most representative thinkers of his age and is at the same time free from the extravagances of Voltaire, which only serves to render his views, in the best sense of the word, typical of the whole movement that prevailed in his days with all its preferences and natural drawbacks. κ.

Die Autonomie der Moral. Mit besonderer Berücksichtigung der Morallehre Immanuel Kants. Von *Kr. Birch-Reichenwald Aars*, Gymnasiallehrer in Kristiania. Hamburg and Leipsic: Leopold Voss. 1896. Pages, 123.

The author is scholarly and discriminative, but it is difficult to get at the trend of his inquiry. He takes Kant as his starting-point but at the same time criticises Kantian ethics for its lack of a psychological foundation. The booklet contains no table of contents, no index, no summary of results, and the reader who wants to learn what view the author takes of any special point has to read the whole pamphlet, and may even then, as the reviewer has learned by experience, not be able to find it. κρς.

RECENT PAMPHLETS AND BROCHURES.

German and Dutch.—The Proceedings of the Royal Göttingen Academy of Sciences invariably contain notes of interest to philosophers, and of the recent issues may be mentioned the articles of Paul Stäckel on some unpublished *Correspond-*

ence Between Gauss and Bolyai (1897, No. 1) and a note of O. Helder on the *Principles of Hamilton and Maupertuis* (1896, No. 2). The first article will be found to be an interesting contribution to the history of the development of the theory of parallels, while the second touches a metaphysical question which has long engaged the attention of the foremost mathematicians and mechanicians.—Prof. F. Lindemann, the author of the celebrated proof of the impossibility of squaring a circle by the Euclidean methods, has recently published in the form of a brochure, an extract from the proceedings of the Royal Bavarian Academy of Sciences, which treats of the *History of Polyhedra and Numeral Signs* (Munich, 1897, F. Straub). Dr. Lindemann has gone very exhaustively into his subject, and has added to his treatise a number of plates figuring some recently discovered ancient polyhedra, and also some numeral characters found on ancient prehistoric monuments. The brochure runs to one hundred and twenty-four pages and contains much of importance to the history of civilisation.—The *Revue Semestrielle des Publications Mathématiques* of the Mathematical Society of Amsterdam, fulfils somewhat the same function for mathematicians as do the *Psychological Index* and the *Année Psychologique* for psychologists. The editors are professors of mathematics in Groningen, Amsterdam, Utrecht, Leyden, and Delft. The print and arrangement are clear, and the whole forms a valuable bibliographical companion for the mathematician (Amsterdam: Delsman and Nolthenius; Paris: Gauthier-Villars et Fils).—Three of the editors of the last-named review, viz., J. C. Kluyver, D. C. Korteweg, and P. H. Schoute also publish in Amsterdam (Delsman and Nolthenius) a mathematical magazine called *Nieuw Archief voor Wiskunde.* Articles are published in the respective languages of the authors furnishing them.

We have five physiological and psychological pamphlets to mention from Germany. The first two are by Dr. M. Verworn, Professor in the University of Jena, and are entitled, respectively: *Erregung und Lähmung* (Leipsic: Georg Thieme) and *Zellphysiologische Studien am Rothen Meer*, the latter of which appeared in the Proceedings of the Royal Berlin Academy of Sciences for 1896. Professor Verworn's views are known to the readers of *The Monist*, his attitude towards vitalism and his relegating the problem of life to cellular psychology being distinctive.—Dr. Th. Ziehen is Professor of Psychology in the same University as Dr. Verworn. His books are well known and a brief article by him on *Sensation* (*Empfindung*) which he has recently written for the *Real-Encyclopädie der Gesammten Heilkunde* (Urban & Schwarzenberg, Vienna and Leipsic) may be consulted with profit.—The phenomena of dreams, hypnotism, and suggestion have been recently engaging much of the attention of German psychologists and notably so at the University of Munich. Dr. Theodor Lipps, whose large work on the *Æsthetics of Space* we reviewed in the last *Monist*, has published a lecture on *The Psychology of Suggestion* (Leipsic: Barth, 1897). The address is mainly directed against that conception of science which would explain all psychological problems by corresponding theories of physiology.—The last of the five pamphlets

alluded to is by Dr. Carl Max Giessler of Erfurt and is entitled *Die physiologischen Beziehungen der Traumvorgänge* (Halle: Max Niemeyer).

In Philosophy, finally, we have (1) a *Kritische Analyse von Arthur Colliers Clavis universalis*, a discussion of a much neglected philosopher, by Arnold Kowalewski, submitted as a dissertation for the Doctorate at Greifswald; (2) an essay of forty-eight pages by Dr. Ernst Tuch on the import of the *Occasionalistic Theory of Lotze's System* (Berlin: Mayer and Müller) which will contain remarks of interest to students of Lotze, now so numerous in the United States and England; (3) a discussion of the *Æsthetic Teachings of Trendelenburg*, by Dr. Wilhelm Deike of Helmstedt; and lastly (4) a pamphlet *Individualität: Pädagogische Betrachtungen* (Eduard Heinrich Mayer, Leipsic, 1897) by a German-American fellow-citizen, Karl Knortz of Evansville, Indiana.

ITALIAN AND FRENCH.—Dr. Giuseppe D'Aguanno, Professor of the Philosophy of Law in the University of Palermo, and editor of a new magazine *Rivista di Storia e Filosofia del Diritto*, is exhibiting creditable activity in the field of philosophical jurisprudential criticism. He has recently published three pamphlets entitled; (1) *La Filosofia Etico-Giuridica da Kant a Spencer* (Part I.); (2) *Appunti di Lezioni di Filosofia del Diritto: I sistemi idealisti tedeschi posteriori ad E. Kant* (Fichte, Schelling, Hegel, etc.); (3) *Lo Spiritualismo e il Positivismo nella Filosofia Giurdica Contemporanea;* the last two of which are connected with his course of lectures in the University. All these pamphlets are published in Palermo. —Italian sociologists seem much addicted latterly to the study of social conditions in the United States, though as a rule their investigations are not at first hand. We have recently received an Italian pamphlet by Augusto Bosco on *Homicide in the United States of America* (Rome: G. Bestero, 1897), however, which seems to be a careful study; at least the author has made use of the best official reports of this country.—M. Henry Lagrésille has ventured upon the enunciation of his philosophical views of the universe in a pamphlet published by Berger-Levrault & Cie., Paris, and entitled *Quel est le point de vue le plus complet du Monde? et Quels sont les principes de la Raison universelle?* M. Lagrésille believes that God exists because universal reason exists. "I reason; therefore God exists." The author's methods are certainly not the methods of what is now considered ideal exact philosophy, and his discussions suffer accordingly.—Of the fruitful and uninterrupted activity of Madame Clémence Royer we have but to mention one recent product, *La Question Religieuse* (Paris, 1898), a problem which this distinguished lady discusses with her wonted insight and erudition.—Educators will be interested in the *Discourses* of MM. Guillaume de Greef, Louis de Brouckère, and Eugène Robert, delivered at the commencement exercises of the New University of Brussels, 1896. The New University of Brussels is a practical embodiment of the most modern ideas of education, and the discussions of the gentlemen just mentioned on *Integral Education and Positive Philosophy* have a distinct value.—M. G. de Vasconcellos-Abreu, the distinguished Professor of Sanskrit in the University of

Lisbon, has recently published in French a note on *The Symbolism of Numbers in the Traditional and Popular Magical Receipts of Europe* (Leyden: E. J. Brill). The Lisbon Professor claims to have established their analogy with the magical formulas of the *Atharvavéda*. He believes that the substitution of symbolical words for numbers and the symbolism of numbers generally, has sprung from traditions originally brought from India, and have taken root in a soil prepared for them by the Pythagorean and Gnostic doctrines, as well as by the religious practices of Christianity.—M. Alfred Binet has undertaken a new enterprise in his *L'Intermédiaire des Biologistes*. The magazine is different from the *Centralblätter* of the Germans, and the *Archives de Physiologie* of the French. It is to be a sort of *Notes and Queries* for biologists, who will find here a journal in which debated questions may be propounded and answered, and a record of bibliography of the subject kept. The Assistant Editor is Victor Henri and the publishers Schleicher Frères, Paris.

AMERICAN AND ENGLISH.—Dr. George Bruce Halsted has enriched his *Neomonic Series* by a translation from the Russian of Lobachévski's *New Principles of Geometry, With Complete Theory of Parallels* (Austin: Texas). Dr. Halsted is gradually accumulating and making accessible to American and English readers all the sources of the Non-Euclidean geometry. The present translation is the first made from the Russian in any language of Lobachévski's *New Principles*.—We have also received the first instalment of the publications of the University of Pennsylvania, New Series, No. 1. It is in the department of mathematics and is entitled *Contributions to the Geometry of the Triangle*, by Robert Judson Aley, Professor of Mathematics in the University of Indiana. The brochure is accompanied by a well-made plate containing the figures needed for demonstrations.—Prof. G. Galbraith of Toronto has had his address on the *Groundworks of Dynamics*, which he delivered in 1897 before the American Association, printed in separate form. Prof. Galbraith emphasises the necessity of the study of the historical development of mechanical ideas, as also the investigation of their physical contents as distinguished from their mathematical form. (The Salem Press, Salem, Mass.)—*The Logical Copula and Quantification of the Predicate* is the title of a pamphlet of 19 pages by Edward Adamson, in which are treated the generalised description of the copula, the quantification of terms, the law of individuality, and the privative concept. The author regards these topics as new, true, and of great utility. (London: David Nutt. 1s. net.)

N. B.—Reviews of the following books have, for lack of room, been crowded out of the present *Monist: The Will to Believe*, by Prof. W. James (Longmans).—*Mental Development: Social and Ethical Interpretations*, by Prof. J. M. Baldwin (Macmillan).—*The Social Mind and Education*, by George Edgar Vincent (Macmillan).—*La structure du protoplasma et les théories de l'hérédité*, by Yves De-

lage (Paris, Schleicher Frères).—*The Non-Religion of the Future*, by M. Guyau (Henry Holt & Co., New York).—*The Evolution of the Idea of God*, by Grant Allen (Henry Holt & Co., New York).—*Geschichte der neueren deutschen Psychologie*, by Max Dessoir (Carl Duncker, Berlin).—*Outlines of Sociology*, by Lester F. Ward (Macmillan).—*Manual of Ethics*, by Prof. John S. MacKenzie (London, W. B. Clive), etc.

ERRATUM.

To the Editor of The Monist:

My attention has been called by the author of the monograph on *Living Substance* to an error in my review (*The Monist*, January, 1898). The statement on page 310, line 22, that certain changes in the embryos of echinoderms were "pointed out by Dr. Whitman" should have read were "pointed out *to* Dr. Whitman."

AMHERST COLLEGE, Jan. 31, 1898. JOHN M. TYLOR.

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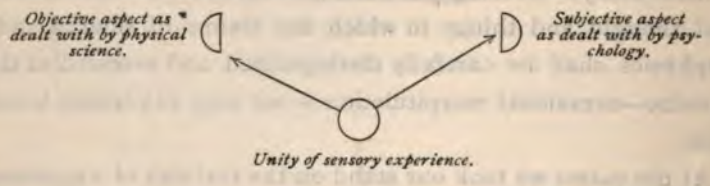
THE MONIST.

THE PHILOSOPHY OF EVOLUTION.

IN SO DIFFICULT a quest as that on which we are engaged in these essays—nothing less than the search for a consistent theory of thought and things in which the claims of science and of metaphysics shall be carefully distinguished and assessed at their true value—occasional recapitulation is not only admissible but desirable.

At the outset we took our stand on the realities of experience. Dealing chiefly with sensory impressions, we contended that their objective aspect, in the phenomena of the world around us, has a reality and a validity which are their inalienable right as facts of experience. The scent, color, form, and position of the bunch of violets, which lay before me, were regarded, in all their minutest details, as realities of experience. But this insistence on the reality of the objective aspect involved no denial of the correlative subjective reality of every sensory impression and of all experience. The plain man, without troubling his head about object or subject, accepts a rough and ready, but quite serviceable, classification of the data of experience into the external things and occurrences in the world around him, and the ideas and emotions which they call forth in himself. The student of physical science, looks outwards and devotes his attention to the nature and sequence of objective phenomena, with only tacit reference to their subjective aspect in consciousness. The psychologist on the other hand looks inwards and deals primarily with the nature and sequence of mental states, re-

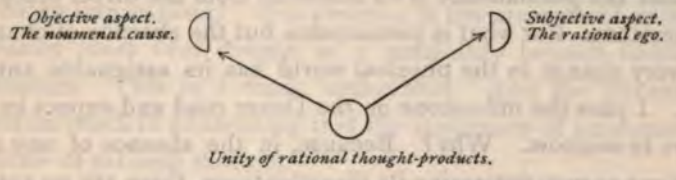
garding physical phenomena as products in and for consciousness. It is almost inevitable that both the physicist on the one hand and the psychologist on the other, should magnify his office; that the one should regard the objective phenomena as primary, and the states of consciousness secondary, while the other assumes a point of view from which the order appears to be reversed, states of consciousness being primary and their phenomenal products secondary. Our purpose was to show that their respective claims are, if due allowance be made for such diverse attitudes, of strictly co-ordinate validity. Starting from the unity of sensory experience we contended that the two aspects, objective and subjective, were the products of analysis. To put the matter in diagrammatic form we have the following scheme:


Objective aspect as dealt with by physical science.
Subjective aspect as dealt with by psychology.
Unity of sensory experience.

Thus we reach analytic dualism as the result of the polarisation of the monistic unity of sensory experience. And it was urged that to regard the phenomena with which physical science is occupied as primarily states of consciousness is not so much false in fact as erroneous in method. It is the result of looking at experience through the spectacles of psychology.

But experience, even when supplemented by the expectations justifiably founded thereon, presents us merely with sequences, observed, remembered, or anticipated. No inductive process dealing with these data, and these alone, can give rise to generalisations concerning their causal connexions or concerning the continued persistence of the occasions of sensory experience. These are the metaphysical importations of our rational thought—the postulates of reason. If the physicist speaks of cause as the *raison d'être* of phenomenal sequence he is dealing with this noumenal existence in its objective aspect. If the psychologist speaks of the subjective activity of the mind, or ego, as underlying and giving connexion to

the sequence of states of consciousness, he too is dealing with noumenal existence. By an extension of analytic dualism into the metaphysical sphere the unity of rational thought assumes its dual aspect. Expressing this as before in diagrammatic form, we have the following scheme:



If now we superimpose upon this scheme that given above, we have the noumenal reality (for thought) underlying the phenomenal reality (of sensory experience).

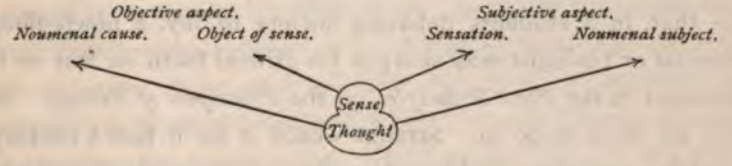
We must therefore, in view of this extended scheme, understand by *experientia est* the existence, not only of sensory experience, but also of rational thought. Herein analysis distinguishes two aspects, the objective and the subjective. And we may perhaps be enabled, through this conception of analytic dualism, to perceive how it comes about that the philosophical biologist, looking at the matter through objective spectacles, sees in experience the outcome of organic evolution; while the philosophical psychologist, looking at the matter through subjective spectacles, sees in experience the product of the individual mind, and exclaims with Descartes, *Cogito*. Genetically *experientia est* has precedence over his dictum; since self-consciousness is a late product of evolution. From the point of view of the philosopher of Descartes's time, however, genetic considerations had scarcely emerged into the light of thought. For him, and for us too apart from evolution, the *cogito* is primary, since it is the ego which alone gives unity and continuity to experience. Both Cartesian and evolutionist may well be right, though they approach the problem of experience from such different directions. We have at present, however, no concern with psychology or the ego. Their consideration must be reserved for a later essay. It is the philosophy of evolution to which we have now to direct our attention.

How necessary a philosophy of evolution is to supplement the hypothesis of analytic dualism will be evident if we revert for a moment to what was said in the last essay concerning J. S. Mill's permanent possibilities of sensation. It was there urged that the permanence is a metaphysical assumption. In reply to this it may be said that the permanence is an inference from the direct teachings of experience. For what is permanence but the absence of change? But every change in the physical world has its assignable antecedents. I pass the mile-stone on the Dover road and expect to find it there to-morrow. Why? Because, in the absence of any such conditions as may determine its disappearance, there are no antecedents of change. This permanence, therefore, when no cause of change can be shown, is an essentially scientific conception. Persistence, to give it another name, lies at the root of the indestructibility of matter and the conservation of energy. The plain common sense of the matter, it will be urged, is that for any physical change, physical antecedents can be discovered. And this is the direct teaching of experience. To which, I reply, that with all this I am in substantial agreement. No doubt experience warrants the expectation of finding the mile-stone, in the absence of physical antecedents of change, still there unaltered; no doubt such expectations are abundantly justified. I have said as much myself. But I understand Mill's "permanent possibility of sensation" to carry with it the implication of continuity of existence independently of all experience. Whether actually an object of sensation or not, there it remains, at present outside experience, but ready to be perceived at any moment. And I still fail to see in what way sensory experience can afford the data for the establishment of any induction concerning the permanence of that which only occasionally swims into its ken. We are forced to admit that the continuous existence of something beyond our senses is a fundamental postulate of reason—a metaphysical assumption justifiable because it so admirably fits and renders explicable the facts of sensory experience.

How then does this conception of an independent existence fit in with the conception of analytic dualism? Granted that it is a

reality for thought. Have we really gone further than asserting that the permanent possibility of sensation is a permanent possibility of thought? Suppose that no one thinks of it. Is it not then every whit as much outside the extended experience which includes thought, as the unseen mile-stone is outside the limited experience of sensory impressions? If experience is the measure of existence continuity must ever remain as a possibility beyond immediate verification. This is, I think, undeniable. And the philosopher admits as much in contending that the continuity of existence is a postulate of rational thought.

The insufficiency of analytic dualism may be exhibited in another way. Let us illustrate it again in diagrammatic form:



Here the analysis of sensory experience gives, on the one hand, the object of sense, and, on the other, the sensation in consciousness; while the analysis of thought gives the noumenal cause underlying the object of sense, and the noumenal subject underlying the conscious sensation. But there is apparently no indication in the scheme of any mode of interaction between the noumenal cause and the noumenal subject with the phenomena of sense as intermediaries. If object and subject are merely distinguishable aspects of a monistic unity, how can this unity be regarded as in any sense the product of their interaction? How can the origin of an experience susceptible of such analysis be explained? The answer to these questions can only be found through an appeal to the philosophy of evolution which may afford us a supplementary hypothesis. To this, therefore, we must now turn.

"Evolution," according to Mr. Herbert Spencer's formula, "is an integration of matter and a concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity; and during

which the retained motion undergoes a parallel transformation." I cannot approach the consideration of the philosophy of evolution without a passing tribute to the genius of Mr. Herbert Spencer. When we remember the time at which he wrote his germinal essay on *Progress: Its Law and Cause*, when evolution was not the watchword which for men of science it has since become, when the conservation of energy was not yet definitely formulated and the *Origin of Species* was still unwritten, or at least not yet published, when scientific knowledge was the possession of the few and such views as Mr. Spencer advocated were damned with the stigma of unorthodoxy; when we remember all this, we must, in common justice, admit that the broad sweep and firm grasp of his unifying conception marked an epoch in the history of scientific thought. It is true that, in a students' debating society to-day, a newly-fledged physicist or biologist may sharpen his critical teeth on this or that statement in the *First Principles* or the *Principles of Biology*. It is good for them to do so. Strange would it be if half a century of scientific specialism had found no flaw in the work of one whose comprehensive intellect took the whole sphere of knowledge for its province. The wonder is that so much has stood the test of an ordeal so searching. All honor be to him whose informing and inspiring work has left an indelible impress upon his age.

In the "Westminster" article of 1877, wherein is to be found the germ of his evolutionary doctrine, after saying that "the investigations of Wolff, Goethe, and von Baer have established the truth that the series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure" through a series of differentiations, Mr. Spencer continues as follows: "Now, we propose in the first place to show, that this law of organic progress is the law of all progress. Whether it be in her development of the earth, in the development of life upon its surface, in the development of society, of government, of manufacture, of commerce, of language, literature, science, art, this same evolution of the simple into the complex, through successive differentiations, holds throughout. From the earliest traceable cos-

mical changes, down to the latest results of civilisation, we shall find that the transformation of the homogeneous into the heterogeneous, is that in which progress essentially consists."

Mr. Spencer here strikes clearly and firmly one of the key-notes of the harmonic process of development. The root-ideas of the conception of evolution are, first differentiation, and secondly the interaction of the differentiated products. How the initial differentiation arose we do not know. Pry as far as we can into the past with the telescope of speculation assisted by the kinematoscope of imagination, and we find differentiation already established. Assuming, with the nebular hypothesis, a primitive fire-mist, we must assume also an environment from which it is already differentiated and to which its heat energy is communicated by radiation. Or if we accept the meteoric hypothesis, we must grant the existence of already differentiated cosmic dust and the interaction of its constituent meteors. If we give yet freer rein to the speculative tendency, which, chastened or running riot, is man's blessing or curse, and, straining our mental vision, search deeper still into the beginnings of our universe, to find in the homogeneous substance that Sir Wm. Crookes calls *protyle*, the stuff from which the chemical elements were differentiated; even in this dim and wholly hypothetical region we are forced to assume, as the antecedent conditions of differentiation, transformations and redistributions of energy, implying a prior differentiation to render such interaction conceivable. Or if, once more, we conceive the elemental atoms as vortex rings, differentiated from the ether and thenceforth interacting, even here at the very threshold of differentiation, we seek for an answer to the question: Under what physical conditions did such vortex motion originate? Nor is this baffling of the speculative reason to be wondered at. The search for origin in terms of antecedence and sequence must ever be illusory. For if we assume, in accordance with the axiom of physical causation, that every change in a material system has antecedent conditions, the assumption involves a retrogression which is endless. For every group of antecedent conditions is itself the outcome of a prior antecedent. It is only through sheer weariness of speculation that we

choose a starting-point, behind which stretches the nebulous haze of agnosticism.

Supposing, then,—with the fullest confession of the speculative nature of the supposition—that the elements arose by the differentiation of protyllic vortices, or by some analogous mode of genesis, we have to note that the differentiation was determinate. Under the given conditions of interaction (whatever they may have been) just these seventy or eighty definite and determinate groupings of protyle which we term the elemental atoms came into being. Nor is their interaction less determinate; and here we leave the tenuous atmosphere of speculation for the more solid ground of observation and experiment. The elements form definite compounds. No one, in the absence of observation or analogy based on practical experience (his own or that of others), could foretell what new characters a compound, resulting from the chemical union of well-known elements, would possess. The nature and properties of complex chemical substances appear to be the results of a determinate synthesis. Science can tell us the antecedent conditions and the consequent products,—so much carbon and sulphur under such and such conditions of temperature and pressure, giving so much carbon disulphide vapor which will condense under other conditions of temperature and pressure to a colorless liquid with a high refractive index. But science cannot tell us why this is so. Its constraining force of chemical attraction, if regarded as more than a measure of the interaction actually observed, is a metaphysical conception. It has no place in the chain of antecedents and sequents but underlies them as their *raison d'être*. And if we accept the metaphysical implication, it is here that we must postulate the source and origin of the determinism that is observed in the phenomenal sequence.

The relatively homogeneous substance, rendered fluid by aqueo-igneous fusion, from which by slow cooling the constituent minerals of granite—its orthoclase, its mica, its quartz, and so forth—crystallise out, exemplifies the process of differentiation by which the Plutonic rocks within the earth's crust originate. And during every stage of the process there is interaction between the develop-

ing determinate crystals and the differentiating magma which forms their environment. Count Bournon described some seven hundred different forms of crystallised calcite. To what extent more recent research has diminished or increased this number matters not for our present purpose. Science bids us believe that for each of the many different forms there are different antecedent conditions. The form is the index of stability under the play of its special environment. And the close association between interaction and differentiation is here again exemplified. But it is unnecessary to dwell longer on the lessons of determinate differentiation which the chemical compound and the crystal teach us with such unmistakable clearness. The lessons of mountain and valley, as interpreted by physical geology, are of a different kind. There is a sense in which every product of evolution may truly be called determinate. Given the slope of the land, its constituent strata, their hardness and resisting power, their jointing cleavage and so forth; given also the denuding forces which play upon its surface, together with the measure of their intensity; and the interaction of denudation and structure determine to a nicety every contour of hill and vale, bay and promontory. Thus is the differentiation of the physical features of the earth's crust brought about. Thus is the face of the continent carved into sculptured relief. But it is obvious that we have here but little of that intrinsic determination which gives to the chemical compound its definite properties, or finds expression in the facetted form of the crystal. We must therefore carefully distinguish two modes of differentiation; that in which the determinism is predominantly intrinsic and that in which it is mainly extrinsic; that which is chiefly due to determinate synthesis, and that which is chiefly the result of free interaction; that which is exemplified by the growing crystal, and that which is typified by the deepening valley, or by the circling planets of the solar system.

So much must suffice for the differentiations and interactions in the inorganic sphere. We now pass on to the organic. The origin of protoplasm is the battle-ground of the creeds. All that science can tell us is that the antecedent conditions of its genesis are unknown. But with so much that is unknown to science it

surely ill beseems us to build too much upon this. It is but our familiarity with the genesis of the crystal that affords any justification for the supposition that this is the outcome of a natural evolution while the genesis of protoplasm is not so. Science can tell us in the one case no more than in the other the *why* of its existence; while even of the *how* of crystalline architecture science can only say that, given such and such conditions, it appears. Of protoplasm we may likewise say that under certain conditions, at present unknown, it appeared. Those who would concentrate the mystery of existence on the pin-point of the genesis of protoplasm, do violence alike to philosophy and to religion. Those who would single out from among the multitudinous differentiations of an evolving universe this alone for special interposition would seem to do little honor to the Divinity they profess to serve. Theodore Parker gave expression to a broader and more reverent theology when he said: "The universe, broad and deep and high, is a handful of dust which God enchants. He is the mysterious magic which possesses" —not protoplasm merely, but— "the world."

Theological implications do not, however, here concern us except as the expressions of that broader philosophy of our day which sees in the origin of protoplasm an example of the process of differentiation which is characteristic of evolution at large. Assuming therefore that protoplasm originated through determinate synthesis, under conditions at present unknown, it is clear that its characteristic properties are primarily of what we have termed the intrinsic type. Like the properties of other chemical compounds they are its natural dower. But they are preeminently such as afford the fullest and freest opportunities for that interaction which leads to differentiation of the extrinsic type. Its capacity of increase by assimilation, its instability combined with a power of recuperation, its tendency to corpuscular division, combined with a tendency for the corpuscles or cells to become incorporated in a complex organism, wherein not only is there a differentiation into diverse constituents, but a constant interaction among the several parts and with their environment; all this affords opportunity for a continuous series of transformations and redistributions of energy,

which give to living beings their wonderful plasticity and their extraordinary variety. Seeing therefore how closely inter-related are the intrinsic properties of protoplasm and the extrinsic interactions which their special character renders possible, it is scarcely a matter for surprise that biologists find it a matter of exceeding difficulty to assign to the two modes of differentiation, intrinsic and extrinsic, their respective rôles in the drama of organic evolution.

That this evolution is determinate, in the widest sense of the word,—that every stage in the development of any organism could be traced, had we sufficient knowledge and mental grasp, to assignable antecedents—is an assumption which the science of biology must accept, or forfeit its claim to be regarded as a science. But whether, or in what degree, those complex differentiations which we term "varieties" are due to intrinsic tendencies is a question concerning which there is much diversity of opinion. Mr. Henslow has adduced a number of instances, among plants, which show that changes of soil and climate induce special and often adaptive alterations in the character and habit of the roots, leaves, and other parts. The well-known and oft-quoted observations of Schmankewitsch seem to show that transference of certain brine-shrimps to water of different salinity induces in their offspring a change of form in the tail-lobes and a change of character in the spines which they bear. Abundant illustration might be given of such modifications in developing organisms subjected to a new environment—modifications of a special kind and of a determinate nature. It is true that we are ignorant how far, in the absence of natural selection leading to the survival of coincident variations, these modifications of structure are inherited. But so far as the individual is concerned the determinate character of these differentiations is noteworthy. Still all we can say is that they seem to be due to some internal power of responding to external conditions in a special way. How that internal power was developed we cannot pretend to know.

The effects of interaction are admirably illustrated by the process of fertilisation on which modern research has thrown much light and is destined, we may hope, to throw more. Taking one of

the higher multicellular animals as an example it has been shown that, within the nucleus of the cell, remarkable changes occur during the process of division. A thread of deeply-staining substance breaks up into a number of curved rods,—the number being constant for the particular organism,—and these, grouping themselves in a definite figure, split along their length, thus giving two sets of curved rods, one set for each daughter nucleus, in the two cells which arise by division. But in the unripe reproductive cells the deeply-staining substance is arranged in so-called tetrads or groups of four units, there being half as many tetrad groups as, in the ordinary cells of the organism, there are curved rods. These immature reproductive cells undergo divisions, during which each tetrad is first halved, giving a dyad, and then halved again, giving a single unit. And in this way each ripe or mature reproductive cell contains half as many of these units of deeply staining substance, as is characteristic of the cells of the organism. In the process of fertilisation the reproductive cell from the male parent unites and fuses with that from the mother organism; a new nucleus is formed by grouping of the units; the normal number for the species is reconstituted; and by the interaction of these units the course of development of the organism which results from the fertilisation of the ovum would seem to be guided.

But the offspring even of the same parents are not all precisely alike. Partly by differences of the inherited substance, partly by differential interaction, they vary around a common mean. And as they develop they are subject to those wider interactions among each other, and in relation to their environment, which Darwin summarised in the phrase, the struggle for existence. The weaker and the less fit are eliminated. Natural selection plays its part. The unfavorable varieties die without mating; the fittest survive to procreate their kind. These differentiations are lost to the race; those are perpetuated. Evolution in the organic sphere is determinate; but, in the current interpretation, it is of the valley type. The elimination which results in natural selection is the denudation of the continent of life. Those organisms which, from superior resisting power, outlive its repeated shocks, stand forth, like the

hills, as survivals in the organic world. The more yielding types have succumbed; one must supply by inference the missing material which once occupied the valley gaps.

But is the determinate evolution of organic life entirely of this valley type? Have we left the intrinsic determination of the crystal type far behind? Has determinate evolution through indefinite interaction altogether superseded determinate variation through the subtle compounding of intrinsic tendencies? We do not know. Some biologists, whose confidence in the all-embracing efficacy of natural selection is equal to every strain, deny the occurrence of determinate variations; which is bold. Others demand more evidence; which is not unreasonable. Others again contend that variation is rendered determinate through the inheritance of modifications acquired by the parents; which is open to question. Yet others assume that intrinsic variations, definite in direction, are the main determinants of organic progress; which is speculative. Some combine two or more of these hypotheses, and see in organic evolution the result of the co-operation of diverse factors; which is a compromise. To those who dislike indefiniteness of conclusions such diversity of opinion is distasteful. To those who love the din of controversy it affords the pleasing spectacle of contending parties. In any case, in the present position of biological science, it would seem to be inevitable. And we must leave the problem open for the science of the future to solve. This only may be said, that granting the determinate evolution which natural selection helps us to explain, there remain cases which, to say the last of it, present difficulties to the candid inquirer. That all the varieties of butterfly coloring and ornamentation, that all the forms and tintings of molluscan life, that all the pencillings of birds' plumage, that all the complications of mammalian tooth-structure,—that these and many other differentiations which are met with in the organic world, are due solely to the action of natural and sexual selection, demands a faith which verges on credulity. And bold must be he who dares to deny that none of these can be due to an intrinsic determinate synthesis such as that to which the protoplasm, whereof these marvellous structures are the products,

owes its origin. But that modesty which is so conspicuous a trait in the modern biologist, should prevent him not only from denying but also from asserting, in the absence of definite evidence, that determinate synthesis is a factor in organic variation.

It is clear, however, that if natural selection be an important agent in progress, and if the variations which are presented to its action in any existing organism be determinate, they may still owe their definite nature to a process of selection. For the very fact that certain variations are selected for survival may foster further variations in a similar direction and give them the appearance of being intrinsically determined. While other variations are checked by the elimination of the organisms in which they occur, these are allowed free play. The existence of a tendency to vary in certain directions cannot, therefore, of itself be taken as sufficient evidence that this tendency is independent of natural selection, since variability in special lines is itself subject to selection. It must be shown that selection is either inoperative, or incapable of producing the particular differentiation in question, before biologists of the school of Mr. Wallace and Prof. Weismann will admit that determinate variation is of the crystal type. Enough has, however, been said to show how exceedingly complex is the problem with which we have to deal, and to justify an attitude of suspended judgment.

When we add to the difficulties which arise from the present and past effects of that interaction with the environment which renders natural selection possible, the further difficulties which arise from the interaction of the constituent parts within the organism itself we realise yet more fully the extreme complexity of the problem of organic evolution. That every cell in the living animal is in vital relation with its companion constituents of the body corporate, is too familiar a fact to need illustration. We may more profitably adduce an example from the early stages of development of the little sand-lance or Amphioxus. The fertilised egg-cell undergoes division first into two, then into four, eight, sixteen cells, and so on, in the successive stages of cleavage by which the constituent corpuscles of the embryo are subdivided. Now if we fix our attention on the first division of the fertilised ovum into two

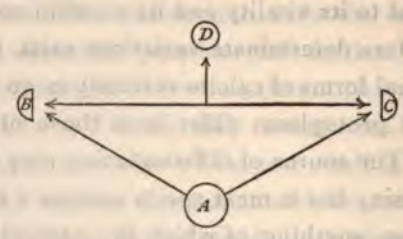
cells, we have here the initial step in a process of continuous differentiation. Each of these two is the parent of half the constituent corpuscles of the completed organism. But this normal differentiation would seem to be dependent upon the continued interaction of the first two cells and their subsequent products. For if, so soon as the ovum has divided, it be shaken somewhat roughly in water, so as to separate the two cells and thus prevent their interaction, each separate cell divides and subdivides in such a way as to form a complete and perfect, but abnormal, embryo, differing from the normal only in the fact that it is half the usual size. The fate of the two cells is therefore dependent on the presence or absence of their interaction. If they remain in their normal relation, each gives origin to half an embryo: if they are separated and interaction be prevented, each gives origin to a complete embryo of half the normal size. And the lesson of the Amphioxus is one that the study of organic development teaches in many forms but all leading to one conclusion; that protoplasmic differentiation is inseparably connected with interaction. It is here that the analogy of the crystal completely fails in adequacy and reach. For the crystal is relatively stable and unyielding. Some interaction there is between the developing mineral and its environment; but it is comparatively slight. Protoplasm, on the other hand, is relatively unstable and plastic. Its capacity for interaction is a characteristic property, essential to its vitality and its peculiar modes of differentiation. If therefore determinate variations exist, they must differ from the variational forms of calcite certainly in no less degree than the properties of protoplasm differ from those of crystalline carbonate of lime. The source of differentiation may be in greater or less degree intrinsic; but it must surely assume a form indefinitely more complex than anything of which the mineral kingdom gives us any premonitory indication.

* * *

In passing to the metaphysical implications which underlie the scientific study of evolution, we must remember that science endeavors with more or less success, but not without many confes-

sions of ignorance, to describe phenomena in terms of antecedence and sequence. Metaphysics, on the other hand, accepting the sequences ascertained by science, seeks, not only to explain the manner of their connexion, but to bring them into fruitful union with conclusions reached in other spheres of thought. The biologist as he patiently traces the developmental history of this or that organism, or of life on the surface of our planet, has no occasion to consider what relation his inquiries bear to those of the philosopher who seeks to explain the genesis of experience. It suffices for him to describe the phenomena as occurrences in a world, the objective reality of which he accepts with perfect confidence. The dualism of analysis forms the platform from which he starts, and it is no part of his business to examine its foundations. He leaves all this to the philosopher. And it now remains for us to see whether that differentiation and interaction which we have seen to lie at the very root of our conceptions of evolution, serve in any way to supplement the conclusions to which we have already been led. For if the assumptions of metaphysics are to have any validity, they must keep in close and vitalising touch with the generalisations of science.

Let us, at the risk of offending those for whom such representations are rather a hindrance than a help, throw into diagrammatic form what appears to be the essence of the evolution process :



The lower circle *A* stands for the relatively homogeneous substance prior to the differentiation which is indicated by the ascending divergent lines. The products of differentiation are represented by the semicircles *B*, *C*, on either hand, and the result of their mutual interaction by the upper circle *D*, which represents a new and more complex unit. Let *A* for example represent the fertilised ovum of

Amphioxus, and *B*, *C* the differentiation involved in repeated cell-division. Then by the mutual interaction of these differentiated products a new unit *D*, the developed Amphioxus, is produced. Such a scheme of course sets forth rather the type to which evolution ideally conforms than what is actually observed in any particular case. Science, as we have seen, is unable to trace back the chain of antecedents to the homogenous substance which is the ideal starting-point. If we take the diagram to illustrate the differentiation of the fertilised ovum of Amphioxus into two differentiated and interacting cells, we must not suppose that the fecundated egg with which we start is more than relatively homogeneous. Its nucleus is itself the product of the union of the already-differentiated nuclei of parental cells, the interaction of which is clearly shown by their behavior within the fertilised ovum. Nay more, the genetic continuity of protoplasm opens up to our mind's eye a vista down an indefinitely prolonged avenue of differentiations and interactions stretching far away back into long distant times. But every step in the evolutionary process was taken in relative conformity to the scheme which the diagram is intended to represent. Innumerable differentiations are now taking place concurrently; and the interactions of their products present a bewildering complexity which we can only grasp piecemeal, by fixing our attention now on this and now on that relationship between the interwoven threads in the fabric of the phenomenal universe. It is only by generalisation, and by carrying to its ideal limit the conception which thus takes definite form, that we reach the simple but comprehensive scheme of a diagram. It thus becomes an abstract plan or formula which may be applied to any concrete example of differentiation. Whether we take the supposed evolution of any two elements from protyle, of the sun and the earth from fire-mist or meteoric dust, of the earth and the moon as interpreted by Mr. George Darwin, of the crystal from its solution, of the orthoclase felspar from the granitic magma, of the first speck of protoplasm from the medium which held its constituent elements, of each pair of daughter-nuclei from the nucleus of the parent cell,—everywhere we find that the formula fits the facts; everywhere we see diverse manifestations of

the same fundamental process—differentiation accompanied by interaction.

It may be said that the coalescence of the products of differentiation is by no means a universal fact. No doubt, if we assume hydrogen and oxygen to be the differentiated products of protyle, they may, under the appropriate conditions, combine to form water. But the differentiated cells of the fertilised Amphioxus ovum remain separate and do not coalesce; and ever since the moon and earth were torn asunder, they have remained apart and have not again combined to form a new and more complex unit. Unquestionably the continuance of direct interaction depends on circumstances and the conditions of the case. As we have seen however in the development of Amphioxus the two cells, though they do not coalesce, continue to influence each other in such a way that under normal conditions they form parts of a more complex whole, the development of which is determined by their interaction. And the same is true of the earth and the moon. They form an interacting system, and this is all that the circle *D* is intended to represent. Still there are many cases in which the differentiated products become relatively independent of each other. The two daughter-amœbæ into which the parent organism divides, go each on its several way, and do not interact to any appreciable extent. And in innumerable cases the products of one differentiation react on the products of another differentiation. To attempt to represent this in diagrammatic form would involve a complexity which would be so bewildering as to defeat the object of a schematic formula. Let the diagram therefore be taken to represent the general fact of differentiation and the not infrequent interaction of the differentiated products under the appropriate circumstances. In brief let it stand for the two root-ideas of the conception of the evolutionary process, which we have seen to be first, differentiation, and secondly, the interaction of the differentiated products.

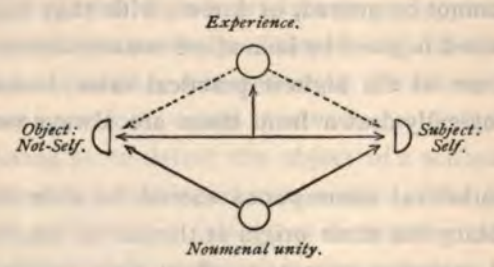
What then is the bearing of this conception on the problem of the genesis of experience? We have seen how, under the polarising influence of analysis, experience assumes a dual aspect, with its objective phenomena and their underlying causal connexions on

the one hand, and its correlative subjective phenomena and their underlying causal connexions on the other hand. But we have also seen that this analysis of experience is insufficient to account for its genesis. Analytic dualism may enable us to distinguish subject and object as diverse aspects of experience. But it gives no explanation—it does not even afford the germ from which may be developed an explanation—of the manner in which this experience with its diverse aspects originates. Hence we assumed a persistent and independent cause, regarding it as a postulate of rational thought. On this assumption experience is the effect of the interaction of the self and the not-self. We may still say with Huxley, however, that "neither of the existence of 'self,' nor of that of 'not-self' have we, or can we by any possibility have, any such unquestionable and immediate certainty as we have of the states of consciousness which we consider to be their effects. They are not immediately observed facts, but results of the application of the law of causation to those facts. Strictly speaking, the existence of a 'self' and of a 'not-self' are hypotheses by which we account for the facts of consciousness. They stand upon the same footing as the belief in the general trustworthiness of memory, and in the general constancy of the order of nature—as hypothetical assumptions which cannot be proved, or known with that highest degree of certainty which is given by immediate consciousness ; but which, nevertheless, are of the highest practical value, inasmuch as the conclusions logically drawn from them are always verified by experience."

But hypothetical assumptions should be able to justify not only their efficacy but their origin at the bar of reason. And the philosophy of evolution appears to afford such justification of the assumed independence and interaction of self and not-self. Applying our evolutionary formula in this region of metaphysical thought we find that it is not less helpful here than it is in the field of scientific inquiry. Evolution is found to supply a key not only to the problems of science but also to those of philosophy. A monistic interpretation on a single comprehensive plan is reached. Analytic dualism is supplemented by the dualism of differentiation which

may be traced downwards into the monistic unity from which the differentiated products have arisen. This monistic unity is represented in our diagram by the lower circle *A*, which differentiates into the self and the not-self, *B* and *C*, from the interaction of which arises the sphere of experience *D*. The self and the not-self have all the independence of differentiation together with the unity which is implied in their derivation from a common source. And the manner of their interaction, (being dependent on a wide variety of circumstances due to multitudinous differentiations within the not-self, with answering diversities in the self), affords ample opportunity for all the complexities which are disclosed by analysis in the sphere of sense and of thought. For here too the interaction only takes place under the appropriate conditions which we term the occasions of experience.

It only remains to indicate as briefly as possible the relation which the diagrams of the earlier part of this essay, representing the dualism of analysis, bear to that which formulates the process of evolution with its dualism of differentiation. It consists essentially in the identification of the subject and object of analysis with the self and not-self of differentiation. Combining our diagrams we have the following scheme:



The lower circle represents the monistic unity prior to dualistic differentiation; hence arises the self on the one hand and the not-self on the other, which by their interaction give origin to experience, including both sense and thought. The dotted lines express the analysis of experience into object and subject coterminous with the not-self and the self of differentiation. But whereas the subject and object of analytic dualism are dependent on the occasionalism

of experience, the self and the not-self are persistent so long as the differentiation holds.

The philosophy of evolution thus extends the conception of metaphysical cause which we reached in the foregoing essay. The differentiation of the cosmos, and the interaction of its differentiated products, are to be regarded as the manifestations, under conditions of time and space, of an underlying activity which is its cause. For the time and space elements are attributes of the phenomenal manifestation, not of the noumenal cause. It is true that, as human beings with limited powers of grasping the nature of metaphysical existence, we are forced to speak of differentiation as manifested in time and of interaction as manifested in space. But if the conclusions reached in the last essay are valid, the metaphysical cause, as such, is timeless and spaceless,—eternal and infinite. How this can be perhaps passes the wit of man to conceive; for to do so it seems necessary to transcend the conditions under which our experience is given. We cannot, however, discuss the question here; and it must suffice to say that the underlying metaphysical activity, as cause, is neither the product of evolution nor its precursor in time; it is that timeless omnipresent existence in and through which evolution is rendered possible.

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GNOSTICISM IN ITS RELATION TO CHRISTIANITY.

GNOSTICISM is commonly regarded as a Christian sect, but it is of far wider significance, and its proper appreciation will throw a new light on the origin of Christianity and the early history of the Church. Gnosticism is a religious movement which is characterised by a seeking for Gnosis or enlightenment for the purpose of finding salvation. Its interests are concentrated upon the psychological problems of the soul and the metaphysical problems of the origin and end of the world, and when we bear in mind that in all its essential features it antedates Christianity we shall at once recognise it as a period of *Sturm und Drang* which immediately preceded the establishment of the Christian Church and paved the way for the acceptance of a religion whose claims and ideals, in contrast to the national religions of antiquity, were not only universal and supernational but at the same time personal and spiritual. Gnosticism is full of vagaries, but it is possessed of a high ideal, and we shall appreciate its good sides if we regard the movement as a problem which stirred the human mind, rather than as a solution. The ideal which Gnosticism presented is great, but the efforts made by Gnostics for its realisation must upon the whole be regarded as failures, and the Christianity of the Church is the result of the spiritual fermentation of Gnosticism. Christianity offers an answer to the questions of Gnosticism, and is in this respect itself a Gnostic movement. We shall see that Christians for a long time actually called themselves Gnostics, and some Church fathers, such as Clement, use the name Gnostic in the sense of

Christian. Thus it would be more correct to speak of Christianity as a branch of Gnosticism than to characterise Gnosticism as a Christian sect. But it was natural that the Christian Church, with increase of power, should begin to condemn all non-Christian Gnostics. By and by the very name began to be repudiated, and the kinship that obtained between the Christian solution of the religious problem and other Gnostic solutions lead to the idea of treating Gnostic teachers as heretical Christians.

While pointing out the pre-Christian existence of the Gnostic movement, we do not intend to slur over the differences that exist between the pre-Christian and post-Christian Gnosis; on the contrary, while we insist on their historical continuity, we would emphasise their difference, which is obvious and striking. The spread of Christianity marks an epoch in the evolution of the conception of the Gnosis inasmuch as the Christian Gospel forced a new issue upon the various Gnostic schools which could not be left unheeded.

The fact that Gnosticism is older than Christianity has never been denied, but, strange to say, its importance has never been fully realised. Hippolytus enumerates a number of Gnostic sects which were older than Simon Magus, which means older than Peter and Paul; and even the old-fashioned among our Church historians, men like Mansel, not to speak of Neander, recognise this fact. Mansel, for instance, says:

"There was in fact an earlier Gnosticism founded on the perversion of the Law, as there was a later Gnosticism founded on the perversion of the Gospel."[1]

Notwithstanding this concession, Gnosticism always appears to us as post-Christian because these Church historians regard Gnostic heresies as a perversion of the Gospel truth, while in fact they are independent attempts, failures though they may be, at solving the religious problems of the age.

In opposition to the narrow views of antiquated dogmatists, several attempts have been made to turn the tables and exhibit the sectarian character of the early Christian Church; but these defenders of the Gnosis, as a rule, overestimate the philosophical

[1] Mansel, *Gnostic Heresies*, p. 75.

value of Gnostic philosophers. They either hanker after the mystical themselves, or forget that even the best of the Gnostics were fantastical and erratic. The methods of the Gnostics resemble a chase after will-o'-the-wisps, and their results are mostly vain speculations and vague dreams. Apollos and Simon Magus may have been more brilliant and more ingenious than Peter and Paul; but the latter were more sober.

There were enough most lamentable vagaries current among the early Christians. There was the belief in the imminent advent of Christ shared even by Paul, to which superstition many thousands fell victims by neglecting the duties of life. There was the communism of the Church at Jerusalem which made of their members destitute beggars, for whose benefit collections had to be taken up among the wealthier Christians of Greece. There was the chiliastic notion, with its apocalyptic excrescences. There was the belief in the resurrection of the material body from the grave, the restitution of the very flesh itself, most seriously insisted upon even in the Apostolic creed. But in spite of all these aberrations Christianity, as compared with the theories of the Gnostic teachers, was sobriety itself. It was at the same time popular and practical, presenting its lessons in the concrete form of the Gospel story, which rendered it definite and human (a most essential condition for a religion to be acceptable) and yet allowed within certain circumscribed limits a sufficient liberty to speculation through the possible interpretation of the significance of the Savior's personality. Hence Christianity became at once an issue in the Gnostic movement of the first century, forcing the various schools to restate their doctrines and to give their verdict as to the nature of the facts asserted by the Christians concerning Jesus of Galilee.

We propose here to review the field once more in the light of these considerations, and hope that we shall thus offer a contribution toward a better comprehension not only of the origin of Christianity but also of its purpose in the economy of the religious development of mankind. Christianity is not an accidental formation, it is a necessary result of the evolution of thought. The history of the Church is, especially in its beginning and during the

Middle Ages, a sad medley of vagaries, intrigues, usurpations, and crimes, but through all the balderdash of dogmatic speculation, of mystical trash, of visionary theorising, even in spite of the heresy trials, Bartholomew slaughters, and *autos da fé*, there goes the red thread of an upward aspiration which slowly, very slowly, leads to better and clearer conceptions, in constant search of the true Gnosis.

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The word Gnosticism is derived from γνῶσις, knowledge, or scientific comprehension. The term is frequently used in its general sense, while the history of its special significance begins with Neo-Platonic philosophers. Plato uses the words γνῶσις and γνωστικὴ ἐπιστήμη, the former in the sense of "scientific comprehension," and the latter in contrast to practical skill as "theoretical knowledge." A new notion of Gnosis originates with the rise of the Neo-Platonic period when a philosophical mysticism began to find the key to the problems of the world by intuitions and visions. Now Gnosis was no longer knowledge but metaphysical or mystical insight, which comes in an unaccountable way by inspiration. But the main characteristic feature of Gnosticism was psychological and soteriological. Almost all Gnostic philosophers and teachers from Philo down to Plotinus are dualists who look upon the soul as a spiritual entity temporarily entangled in the world of matter and longing for a return to its source. Material existence is in their opinion the cause of sin and evil, and to be delivered from the bondage of the body was the final aim of the soul and an end devoutly to be wished for.

Gnosticism is full of Oriental notions, and under Gnostic influences the same religious ideals, so foreign to both the Greeks and the Jews, which had gained recognition in India about six hundred years before our era, began to spread in the West. Indeed, we shall scarcely be mistaken in regarding a closer contact with India as the beginning of the Gnostic period. The nations of antiquity had developed each for itself in close seclusion, which in several instances was guarded with a rigid religious sanctity and with patriotic narrowness. They came in contact with one

another, but shrank from any friendly exchange of thought. The Assyrians conquered the Asiatic nations, but they would have deemed it beneath their dignity to learn from them, or to accept even the best features of other peoples' national peculiarities. Even the Greeks, the broadest and most civilised nation, showed an unconcealed contempt for everything that was not Greek, and Alexander the Great became very unpopular among his soldiers through his sympathy with Orientalism. The Jews, as we know now through the excavations in Mesopotamia, learned much from their conquerors while residing in Babylon, but they learned in spite of themselves; Babylonian philosophy and civilisation was forced upon them in their captivity; they were surrounded by Babylonian influences and accepted unconsciously that which at once recommended itself as good. They inhaled it with the air and knew not how they got it, which explains the fact that they never gave credit for it. On the contrary: while they adopted such institutions as the Sabbath and accepted the purer monotheistic views of educated thinkers, they put upon the Babylonian temple-worship the worst interpretation, probably the interpretation of the isolated philosophers and freethinkers of Babylon and denounced the popular religion of the country as gross idolatry.

The narrowness of national seclusion which prevailed generally until the days of Alexander the Great yielded gradually to a mutual recognition under the constant increase of a friendly exchange of thought. Greek as well as Indian views met in Syria and were compared with the faith of the Jews, producing a powerful fermentation in the religious convictions of the people.

The Jews who by some national instinct and by an inborn commercial talent spread among the nations long before the destruction of Jerusalem in 70 A. D., living, as it was called, in the "diaspora," played a most important part in this period, for they were not mere bankers and traders, they served also as the most important channels through which Indian and Greek thoughts flowed to mingle with the Jewish belief in new and fantastic combinations of religious ideals, prophecies, and meditations.

There is an opinion which prevails at present that Buddhism

had been imported from India and ought to be regarded as the mother-religion of Christianity; but in spite of the innumerable arguments that can be presented in favor of this theory,[1] the conclusion that Buddhism reached Palestine at, or shortly before, the advent of Christ, and that it must be held responsible for the origin of Christianity, is not admissible; for all the peculiarly Buddhistic teachings, especially the doctrine of the anatman or non-existence of the ego-soul, are obviously absent in Christianity. The parallelism that actually obtains between Buddhism and Christianity can be explained otherwise and proves only indirect relations between these two systems of faith. We may fairly assume that Hindu views reached Syria in vague and frequently self-contradictory forms, which may have been as much Brahmanical, or Jain, as Buddhist. Buddhist teachers or monks are never expressly mentioned or quoted, but the naked ascetics, or, as the Greek called them, Gymnosophists, are frequently alluded to. There are reminiscences of the Samkhya philosophy as well as the Vedanta. This much is sure that the Buddhist faith did not predominate, but came in only for its share with the rest; and in this it offered, together with certain ethical maxims, for instance the eradication of hatred (which, however, is not exclusively Buddhistic), merely such incidental items as Jataka tales and parables. But we do not meet with the main solution of the religious problem, which alone can be regarded as typically Buddhistic.

Syria is apparently the home of those Gnostic sects which by their own choice called themselves Gnostics, and the seeds of Gnostic views were, probably through Jews, transferred from Syria to Alexandria and to Asia Minor, where the new doctrines proved attractive and apt to revolutionise the traditional ethics of the people. Formerly procreation of children was regarded as a duty and the acquisition of wealth as a blessing, now it became known that there were religious men of great dignity who sought salvation in absolute chastity and poverty. The highest morality of the In-

[1] For the argument which the writer has collected see his book *Buddhism and Its Christian Critics*, pp. 171–236.

dian anchorite was not a victorious self-assertion in the struggle for existence, but a surrender of all strife and a radical renunciation of self.

The spirit of the times showed itself in the foundation of various religious societies which originated somewhat after the fashion of the modern theosophical movement. There were bands of students in almost all the larger cities who investigated the doctrines of salvation and immortality, and many of them practically applied the new principles and lived lives of absolute poverty and chastity. It is not to be expected that the names and history of these religious societies (most of which were temporary and local movements) should be preserved except where they came into collision with an established faith that combated them and denounced their doctrines as heretical, or where the interest of a sympathetic thinker and author recorded their aspirations for the benefit of posterity. The large mass of the people who followed the various pursuits of life in wonted routine, naturally would look upon the practices of such odd people as a ridiculous mania and nothing else. It is therefore a matter of course that the historical records of the movement are not complete. There are many vague hints, but definite and reliable information is rare. What we have, however, is important and sufficient to establish the character of the movement as a powerful religious fermentation and a groping after the deliverance of the soul from the body of death.

The Gnostic aspirations are partly lofty and philosophical, partly ethical, going to the extreme of rigorous asceticism, partly fantastical, evincing a belief in visions and miracles after the fashion of common conjurers.[1]

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[1] An interesting Gnostic document of the latter class is a papyrus which is now MS. No. 10,170 of the British Museum, the second part of the same papyrus being in Leyden. It has been published in *fac simile* and partly translated from a Koptic dialect into German by J. J. Hess of Freiburg in Switzerland. The translated passage is an incantation to God to reveal Himself. It is extremely fantastic and superstitious. Mention is made in it of a lamp which is questioned, reminding one of Aladdin's lamp. Professor Hess says "the papyrus is a book of magic of the pagan Gnostics, the precursors of the Christian sects of the same name." The MS. dates probably from the second century of our era, but is apparently based upon ancient traditions. It shows some Jewish but no Christian influence.

The Cabala shows many influences of Gnosticism which must be referred to un-Jewish sources. Its main doctrine, which is the theory of the *sepiroth* or emanations, is Gnostic, and the belief in angels and archangels or spiritual presences through which God operates, apparently derived from Babylon, can be met with among almost all Gnostic schools. Especially the idea of the archetypal man as the highest Deity reminds us of similar conceptions among the Ophites and in the doctrines of Simon Magus. But our attention must first be concentrated upon those Gnostic notions which are well attested as pre-Christian and continued in the beginning of our era as competitors of the doctrines of the Church.

Philo, an Alexandrian Jew, a contemporary of Christ, appears to have been one of the maturest minds among the searchers for the Gnosis.

Philo does not call himself a Gnostic, but in all particulars which constitute Gnosticism he was a genuine Gnostic. He believed in ecstatic visions as the directest means of attaining union with God, the source of all souls, from which the spiritual powers emanated. He tried the ascetic life of hermits himself and expected salvation through liberation from the body. With all this Philo remained a Jew. In his *Vita Mosis* he places the great law-giver and founder of the Israelitic religion far above the sages of the Greeks, representing him to be the incarnation of the supreme *logos* of God; and when the Jews in the year 40 of our era sent an embassy to Rome to persuade the Emperor Caligula to abstain from claiming divine honor from the Jews, they chose this venerable philosopher of Alexandria, who was then well advanced in years, as their spokesman.

Among the books which bear Philo's name there is one entitled *De Vita Contemplativa*, which describes the life and manners of a sect called the Therapeutæ, i. e., "those who minister," which may mean either Healers or God-worshippers. These people retired from the world and led an ascetic life near the Mœris Lake. Bread, water, and salt, was their sole food, which was sometimes seasoned with hyssop. They remained in isolation for six days, devoting themselves to contemplation and austere penances, and

giving the seventh day (seven being a sacred number with them) to common prayer and hymn-singing. The authenticity of the book has been doubted of late by Lucius, who believes that it is the work of an anonymous author of the third century whose intention was a glorification of monastic life, which in those days rapidly began to become a Christian ideal.[1] But would not an enthusiastic Christian monk have preferred to derive the monastic system directly from Christ or from one of the apostles? Could the thought of attributing the book to Philo and of representing the institution of these ascetics as older than Christianity originate in a Christian mind? On the other hand, we must consider that the Essenes and Nazarenes, whose historical existence is unequivocal, offer a parallel which proves that the monastic ideal of the Therapeutæ existed long before the Christian era, and was, beginning with the second century B. C., a very powerful factor in the religious life of many thousands of earnest people. Holtzmann says (*Einleitung*, I., p. 100) that even if the *Vita Contemplativa* were not genuine the Therapeutæ might remain historical. At any rate, we might as well reject the antiquity of all Hindu scriptures in which monastic institutions are mentioned if we must regard monasticism as a typically Christian ideal.

Monasticism became a Christian institution in the third century, but it existed as a Gnostic ideal before that time. It is one of the factors which belong not merely to the third century A. D., but begin to show themselves in the *Sturm und Drang* period preceding Christianity. Indeed, the Christianity of the first and second centuries did not favor but criticised and condemned monkish ethics. Tertullian, who lived about 200 A. D., contrasts (in his *Apol.*, XLII.) Christianity to the monkish aspirations of his time, which he regards as decidedly un-Christian, saying, "We are not

[1] The idea of the spurious character of Philo's *De Vita Contemplativa* is set forth in the pamphlet of P. E. Lucius, *Die Therapeuten und ihre Stellung in der Geschichte der Askese*, Strassburg, 1879. His theory is based on the gratuitous assumption that the Theraputæ are an isolated phenomenon of Philo's age and should be explained as a Christian forgery of later date. For a thorough refutation of his theory compare Fred. C. Conybeare's *Philo About the Contemplative Life*, Clarendon Press, Oxford, 1895.

Indian Brahmans, or Gymnosophists, dwellers in woods, or exiles from life; we sojourn with you in the world."

The Essenes[1] as described by Josephus, Philo, and Pliny were an ascetic sect whose main settlement of about four thousand members was near the Dead Sea. They practised chastity and had all things in common. They were pious Jews but abstained from the bloody sacrifices of the temple service, suffered no slavery, abstained from strong drink, and had a ritual of ablutions and baptisms. They rejected the oath and possessed a literature of sacred books of their own, which, together with their esoteric doctrines and their symbolical interpretation of the Bible, were kept secret. Their novices had to make a formidable vow before they could be admitted to membership. Several of their institutions, for instance the ordinance to abstain from the use of oil for unguents, reminds us of the same Buddhist precept; their reverence for the sun, of Parseeism; their belief in the pre-existence of the soul, of Orientalism in general. It is generally recognised that their ascetic principles

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[1] The word Essene, or Essees (in Greek Ἐσσηνοί and Ἐσσαῖοι, in Latin *Esseni*, is derived by Ewald from חָסָא preserver, guardian, a rabbinical term, because they called themselves "watchers, guardians, servants of God." Others derive the word from אָסָא (to heal). Both derivations would remind one of the Therapeutæ. The root חָסָה (to fly, to take refuge) seems to be most probable, philologically considered, especially as the word is used in the sense in which the Buddhist takes refuge in the Dharma, illustrated in such phrases as חָסָה בְּ יְהוָה (to take refuge in God), Psalms ii. 12; v. 15; vii. 2; xxv. 20; xxxi. 2; xxxvii. 40, etc. A fourth derivation is from חָסִד (to be pious, to be enthusiastic; to be zealous in love, Philo says they are called "Essenes" on account of their holiness (*παρὰ τὴν ὁσιότητα*) and uses the term ὅσιοι, i. e., "the saints," or "the holy ones," as a synonym for Essenes. This hint, however, is of little avail, as it would suit both these latter derivations.

The word Ebionites אֶבְיוֹנִים means the poor.

The name Nazarene, *Ναζωραῖοι*, must not be confounded with Nazarite נָזִיר an abstainer, who as a visible sign of his vow let his hair grow, but it may be derived from the root נָזַר in the sense of "Separatist." The Niphel of the verb means "to separate oneself from others; to abstain, to vow, to devote oneself to."

The early Christians seem to have been most closely allied with the Nazarenes, for as early as in the year 54 of our era (see Harnack's *Chronologie*, p. 237) St. Paul was accused by the Jewish authorities as being a ringleader of the sect of the Nazarenes. (Acts, xxiv. 5.) The name has nothing to do with the name of the town of Nazareth which was presumably written with a צ (*Tsaddi*) or sharp *ts* sound. The name Nazareth is nowhere mentioned in its original Aramaic form, and occurs only in the New Testament whence it made its way into the patristic literature of later Christianity.

show Oriental and un-Jewish influences, but we must concede that a limited asceticism was not altogether foreign to Judaism, where it showed itself in the vows of the Nazarites, who let their hair grow as a sign of consecration.[1]

There are reasons to believe that the Nazarenes and Ebionites are Jewish sects which antedate Christianity. The Ebionites derived their name from the Hebrew word אֶבְיוֹן (*ebjón*), i. e., poor, which may have been characteristic of their moral ideal of renouncing property. They believed in the coming of the Kingdom of God on earth, which in later days was called the millennium. Their religion was a gospel of the poor and for the poor. Origen informs us that in his days there were two kinds of Ebionites, such as affirmed and such as denied the supernatural birth and nature of Jesus. The Nazarenes are frequently identified with the Ebionites, and the word may be another name for the same sect. The etymology of the term is obscure, but can scarcely be regarded as another form for Nazarite; nor has it anything to do with the town Nazareth. The early Christians were called Nazarenes by the Jewish priests,[2] which suggests the idea that the early Christians (who at any rate on joining the congregation renounced all

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[1] The same Lucius who regards the *Vita Contemplativa* as the forgery of a Christian monk, attempts to deny that there is any foreign influence traceable in the doctrines of the Essenes. See his pamphlet *Der Essenismus in seinem Verhältniss zum Judenthum*, Strassburg, 1881. He believes that the Essenes are in name and in fact identical with the Assideans mentioned in the first book of Maccabees ii. 42 *et alias*, explaining their name as the חֲסִידִים *hasidim*, and which again is the same as Ἀσιδαῖοι or Χασιδαῖοι. This granted, he removes all difficulties by referring the Gnostic features of the Essenes, such as their reverence for the sun, their celibacy, their temperance in eating and drinking, their communism, their doctrine of guardian angels, of the immortality and the transmigration of the soul, etc., to those features of the Old Testament Apocrypha, especially the Book of Enoch, the Psalms of Solomon, and Leptogenesis, which are obvious symptoms of Gnosticism. He further believes that their objection to bloody sacrifices was simply a notion that the second temple was no longer acceptable to God since the legitimate Aaronitic high priests had died out. It was natural that the Assideans, after the treachery of the degenerate high priest Alkimos (mentioned in 1 Mac. 7) withdrew from the temple service under the Hasmonæan priesthood.

[2] See Acts xxiv. 5, where the Apostle Paul is called a ringleader of the sect of the Nazarenes.

their possessions and lived after Ebionitic principles) belonged to the Nazarene fellowship.

When we assume that the early Christians knew of the Essenes and their institutions (which is not only probable but must be regarded as a matter of course), we may grant that they objected to the separatist as well as the monkish features of their life. Christ, who is frequently and perhaps rightly represented as being strongly influenced by Essene views and practices, retained their poverty ideal, but broke away from them in other respects: he ate with publicans and sinners, and did not practise any one of the Essenian austerities. As to the Essene love of esoteric doctrines, the Gospels state that the time had come to preach upon the housetops what was whispered in the ear. (Matt. x. 27, and Luke xii. 13.)

The ascetic ideal of voluntary poverty and absolute chastity remained for a long time a secret doctrine until it was preached openly and recommended to the world as the sole but certain means for establishing on earth the Kingdom of God, where there is no marrying nor any being given in marriage. This moral ideal of a universal monkhood is closely connected with the expectation of the appearance of the Messiah, which among the early Christians after the death of Jesus naturally changed into the doctrine of the second advent of Christ, which was perhaps the most essential feature of early Christianity.

The Gentile Christians, following the leadership of St. Paul, soon disavowed the Judaistic tendencies of the Jewish Christians, and went so far as to oppose some of the encratic tendencies of kindred Gnostic aspirations; still St. Paul followed the tendencies that generally prevailed in those days. Although he was liberal enough in his missionary zeal not to insist on celibacy, he greatly recommended it as superior to marriage, which latter is after all only suffered as a concession to human weakness. There can be no doubt that the notion of the holiness of poverty and chastity was retained, leading at last naturally to a renewal of monkish institutions, which in the third century spread rapidly and were at once recognised by all Churches of the time, in Asia as well as in

Africa and Europe, as the realisation of the highest ideal of Christian morality.

The conception of Gnosticism as a pre-Christian movement will serve to intensify our interest in the religious aspirations which characterise the last two centuries of the pre-Christian era; and we shall find that the most important influence of the Gnostic ideal shows itself in the wisdom literature of the Jews, the oldest products of which have been embodied in the canon, while the more recent ones belong to the Apocrypha of the Old Testament consisting mainly of apocalyptic books or revelations. Here the term Gnosis is not as yet established, although we meet with all the main ideals of later Gnosticism. The place of the word Gnosis is taken by the term wisdom or sophia, which is frequently personified and, in a very anti-Jewish fashion, represented as the companion of God. We read in the Wisdom of Solomon (viii. 3–4), a product of Alexandrian Judaism dating from the second century B. C.:

"In that she [i. e., wisdom] is conversant with God, she magnifies her nobility. Yea, the Lord of all things himself loved her. For she is privy to the mysteries of the knowledge of God, and a lover of his works."

From this sophia-doctrine there is but one step to that Apocryphal Christianity which makes the Holy Ghost the mother of the Messiah, a view which is still preserved in St. Jerome, iii. 2, who disapprovingly quotes from the Gospel according to the Hebrews the following saying of the Saviour:

"My mother, the Holy Spirit, took me just now by one of my hairs and carried me off to the great Mount Tabor."

The incarnation idea of Brahmanism which shows itself mainly in the legends of Krishna is quite a pronounced feature of Gnosticism. Great men are regarded as manifestations of the eternal wisdom or as divine powers that have become flesh, and even individual traces of Indian myths reappear in Gnostic writings.

The legends of Abraham show obvious traces of Gnosticism. They were Christianised in the Apocryphal book "The Apocalypse of Abraham," but are in their essential features undoubtedly older than Christianity, for Philo and Josephus, not to mention others,

quote individual incidents from them. In its purely Jewish form, the legend is most complete in the "Midrash Bereshit rabba" in a reference to Genesis xi. 28.[1] Another not less important tradition of the same subject is found in the Book Hajashar,[2] where we find several strange oriental legends woven into Abraham's life.

At Abraham's birth an unusual star appears which rapidly moving about devours four other stars, one in each quarter of the sky. The Magi inform King Nimrod of the significance of this phenomenon which foretells the unparalleled greatness and wide dominion of the child. Thereupon the King demands of Abraham's father, Tharah, the surrender of his son, who at once hides the mother with her new-born babe in a cave and substitutes the infant of a slave. All this reminds us of the kindred Krishna myths which have been incorporated in the Buddhist legends. The child Abraham, when quitting the cave for the first time, takes the sun as God; but the sun goes under and he now believes in the stars and the moon. But they, too, disappear at the reappearance of the sun, and now he understands that all visible things are the messengers of God, who alone is Lord. Abraham's father Tharah is described as an idol manufacturer who is rebuked by his son for the sin of worshipping things made by his own hand. Abraham is punished and thrown into a fiery furnace, but he escapes unhurt.[3]

The old legends of Abraham's life make him pray for a special revelation from God himself, which at last is granted after a purification of fasting. An angel whose name is Jaoel and whose power (like that of Metatron of the Talmud) is represented as above all other angels and creatures, leads Abraham into the highest heaven,

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[1] Migne, *Dictionnaire des Apocryphes*. Vol. II., pp. 1103. Paris, 1858. Cf. B. Beer, *Leben Abrahams* etc. Leipsic, 1859.

[2] See *Wünsche, Bibliotheca Rabbinica, Midrasch Bereschit rabba, Das ist die haggadische Auslegung der Genesis*, Leipsic, 181. Conf. Abr. Geiger, *Was hat Mohammed aus dem Judenthum aufgenommen?* p. 123.

[3] There are several versions extant. The Greek text of "the Testament of Abraham" has been edited by M. Rh. James with an appendix containing extracts from the Arabic version of the Testaments of Abraham, Isaac, and Jacob by W. E. Baines. Cambridge, 1892. The Russian scholar G. Nathanael Bonwetsch has translated a version of the Apocalypse of Abraham from the South Slavonian into German (Leipsic: Deichet Nachf., 1897).

where he shows him all the secrets and reveals to him the future of the world. There he sees the stars from above and understands that they represent the number of his descendants. The æons of the later Gnostics play an important part and God is characterised as he who existed before the æons. The fall of Adam and Eve in paradise is described as sexual intercourse, and the fruit of the tree is said to be the grape.

In the book of Enoch the Jewish Gnosticism is very apparent. It explains in an allegorical form God's plan of the world's history as given to the patriarch Enoch. The Israelites are compared to a flock of sheep to whom a great sword is given to wage war against the animals of the field. The sealed book of guilt shall be opened, and judgment will be pronounced over the stars and the seventy shepherds (the chiefs of the Gentiles); they are condemned and together with the blind sheep (the apostate Jews) thrown into the fiery pit. But from the midst of the sheep rises a white bull (the Messiah) with great horns, whom the animals of the field will fear; and all the races of the earth will become like the white bull. Then a new heaven will be in the place of the old heaven, and thus the goal of life is reached.

While Enoch's demonology smacks of the religious myths of the Gentiles, his ideas of a Messiah are strongly spiritualised. The Messiah is neither a man nor a God-man; he is a divine presence. We read of the Messiah, commonly designated "the son of the woman," sometimes "the son of man," and once "the son of God," that he existed from the beginning:

"Ere the sun and the signs [in the zodiac] were made, ere the stars of the heavens were created, his name was pronounced before the Lord of the spirits. Before the creation of the world he was chosen and hidden before Him [God], and before Him he will be from eternity to eternity."[1]

It is a pity that we do not possess the original but only an Ethiopian version of the Book of Enoch, which has been translated into German by Dillman, for it is of great interest to the historian. It apparently embodies two heterogeneous views: one Judaic, the

[1] Translated from Dillmann's German translation.

other gentile Gnostic; and it is probable that the original Book of Enoch, written by a Jew of the Pharisee party, found an Essene interpolator who superadded the spiritualistic ideas of his sect. The hypothesis of a Christian interpolation is not very probable, because a Christian would naturally have introduced some positive and definite feature's of Christ's life, such as it was represented in the early Church, the more so as the Gnostic interpolations of the book are very pronounced and even in translations easily recognised. We read, e. g. (in xlii. 2):

"Wisdom came to live among men and found no dwelling-place. Then she returned home and took her seat among the angels."

The salvation of mankind is not expected from the death of the Messiah, but through the revelation of the divine Gnosis:

Enoch proclaims that—

"All the secrets of wisdom will flow from the thoughts of his [the Messiah's] mouth, for the Lord of the spirits has given wisdom unto him and has glorified him. In him liveth the spirit of wisdom, and the spirit of Him who giveth comprehension, and the spirit of the doctrine and of the power, and the spirit of all those who are justified and are now sleeping. And He will judge all hidden things, and no one will speak trifling words before Him, for He is chosen before the Lord of the spirits. He is powerful in all secrets of justification, and injustice has no place before him."

While the spiritualistic views in the Book of Enoch, especially the supernatural personality of the Messiah, are not peculiarly Christian but Essenic or Gnostic, standing in contradiction to the idea that the Messiah would become flesh and live among men as a real man, we must recognise the fact that the Gnostic interpolations, or at least one passage, must have been written in the year 79 A. D., or shortly after, as it appears to refer to the eruption of Vesuvius and the formation of the hot springs at Bajæ, while other passages relating to the enemies of the Jews ignore the Romans so completely that they must have been written at a much earlier date.[1]

[1] Ewald assigns one part of the book to the year 144 B. C. and the other two to several years later, about 136–106. The interpolations of a later date, especially the reference to the events of the year 79, are probably written by a Gnostic who had not as yet heard of Christianity.

Very valuable books among the Apocrypha, showing traces of Gnostic influences, are the book of Daniel and the two books of Esdras. In these writings the idea of a bodily resurrection of the dead from their graves is, for the first time in Jewish literature, pronounced with great vigor. We read in the book of Daniel:

"Many of them that sleep in the dust of the earth shall awake, some to everlasting life, and some to shame and everlasting contempt. And they that be wise shine as the brightness of the firmanent; and they that turn many to righteousness as the stars for ever and ever."—Daniel, xii. 2–3.

And Esdras says:

"In the grave the chambers of souls are like the womb of a woman:

"For like as a woman that travaileth maketh haste to escape the necessity of the travail; even so do these places haste to deliver those things that are committed unto them."—2 Esdras, iv. 41–42.

The expressions "the son of man" and the un-Jewish phrase "the son of God" now become current terms in Jewish literature, at least among the less conservative authors.

The Gnostic ideal, in spite of occasional outbreaks of a broad universalism, is frequently allied with a narrow Jewish chauvinism and a bitter hatred of the Gentiles. The authors of these books proclaim that although the enemies of the Jews are now triumphant, they are doomed to perish in the near future. The present is characterised as a period of trial in which many Israelites will abandon the cause of God, but a remnant will remain, for again and again are we assured that the world has been made for the sake of Israel and the other nations are like unto spittle. (2 Esdras, vi. 56.)

The end of this world draws near. Esdras says:

"The world hath lost its youth, and the times begin to wax old."—2 Esdras xiv. 10.

Great tribulation prevails, and greater hardship still will come upon the world, but at last "evil shall be put out, and deceit shall be quenched." (2 Esdras, vi. 27.) Better times will come, and the earth shall be given to the people of God for whom the world was created. That which is mortal will be done away with, and the life of the chosen people will be purely spiritual.

Esdras sees in a vision a great people praising God in song upon Mount Zion, and one young man in the midst of them of high stature, taller than the rest, setting crowns upon their heads. Esdras asked the angel that stood by him:

"Sir, what are these?"

"He answered and said unto me, These be they that have put off the mortal clothing, and put on the immortal, and have confessed the name of God: now are they crowned, and receive palms.

"Then said I unto the angel, 'What young person is it that crowneth them and giveth them palms in their hands?

"So he answered and said unto me, It is the Son of God, whom they have confessed in the world."—2 Esdras, ii. 44–47.

Esdras proclaims even the name of the Messiah. He informs us that the Lord said to him:

"My son Jesus shall be revealed with those that be with him, and they that remain shall rejoice within four hundred years." (2 Esdras, vii. 28.)

In addition to a definite fixation of the name and personality of the Saviour so eagerly longed for, we find in the book of Esdras and other Apocrypha many most beautiful gems of thought, which partly remind us of Christian ways of thinking and partly directly anticipate Christian phraseology; Thus we read:

"For the empty are empty things, and for the full are the full things."—2 Esdras, vii. 25.

"The most High hath made this world for many, but the world to come for few."—2 Esdras, viii. 1.

"There be many created, but few shall be saved."—2 Esdras, viii. 3.

"Notwithstanding the law perisheth not, but remaineth in its force."—2 Esdras, ix. 37.

In the name of God, an angel explains to Esdras the origin of evil as follows:

"A city is builded, and set upon a broad field, and is full of all good things.

"The entrance thereof is narrow, and is set in a dangerous place to fall, like as if there were a fire on the right hand, and on the left a deep water:

"And one only path between them both, even between the fire and the water, so small that there could but one man go there at once.

"If this city now were given unto a man for an inheritance, if he never shall pass the danger set before it, how shall he receive this inheritance?

"And I said, It is so, Lord. Then said he unto me, Even so also is Israel's portion.

"Because for their sakes I made the world: and when Adam transgressed my statutes, then was decreed that now is done.

"Then were the entrances of this world made narrow, full of sorrow and travail: they are but few and evil, full of perils, and very painful.

"For the entrances of the elder world were wide and sure, and brought immortal fruit.

"If then they that live labor not to enter these strait and vain things, they can never receive those that are laid up for them."—2 Esdras, vii. 6–14.

The Gnostic element made itself most plainly felt in the Wisdom of Solomon. While barrenness is regarded as a curse among the Jews it is praised in the Wisdom of Solomon; we read:

"Blessed is the barren, that is undefiled which hath not known the sinful bed: she shall have fruit in the visitation of souls." (iii. 13.)

"Better it is to have no children and to have virtue, for the memorial thereof is immortal." (iv. i.)

As birth and death are always closely connected in Indian thought, especially in Buddhism, so immortality is in these Gnostic aspirations made dependent upon the realisation of the ideal of virginity. As birth leads to death, so the abolition of death depends upon the abolition of giving birth. In this sense the church-father Clement (ii. 8) quotes from some of the lost Gospel the following strange saying of Jesus:

"Keep the flesh holy and the seal undefiled that ye may receive eternal life" (Clem. Rom. ii. 8).

The same idea is still more clearly expressed in another passage, quoted by Clement (Stromata iii. 6, 9, 13) from the Gospel of the Egyptians. In reply to Solome's question, "How long shall death reign?" Jesus answers:

"As long as ye women give birth. For I came to make an end to the works of the woman."

The abolition of the thought of sexuality indicates the restoration of the Kingdom of God. We are informed by the same Clement, quoting from the Gospel of the Egyptians, that the Lord on being asked when the time would be fulfilled, is said to have replied:

"When you tread under foot the covering of shame and when two shall be one [that which is without as that which is within] and the male with the female, neither male nor female."[1]

These quotations prove that even after the foundation of the Christian Church there were various conceptions of the essential doctrines of Christianity, from which in the struggle for survival the canonical Scriptures prevailed while the other conceptions were rejected as heretical, and the non-canonical Gospels were proscribed together with all non-Christian Gnostic books, so that only fragments of them have been preserved. But, before the canonical Christianity was fixed, there was little or no hostility between the Christians and other Gnostics. There was a period in which the difference between the general Gnostic view, and Christianity was esteemed of so little consequence that Christians did not hesitate to call themselves Gnostics and regarded the non-Christian Gnostics as brethren with whom they differed on points of secondary importance only. Thus the same Clement of Alexandria from whom we quoted some references to the lost Scriptures of the early Christians constantly calls the Christians Gnostics and demands that the Gnosis be pursued and attained solely for its own sake. He says (Strom. iv. 22, 136):

"It does not behoove a Gnostic to pursue the comprehension of God for some gain that 'this may happen to me' and that 'that may not befall me.' The knowledge (Gnosis) itself suffices him as a cause for study. Indeed, I would boldly declare that he who seeks the Gnosis for the sake of divine comprehension itself, pursues the Gnosis not even for the sake of being saved."

Nor is Clement isolated in his use of the term Gnostic as applying to Christians. The usage is well established in a great part of patristic literature. Take for instance the *Prophetic Scriptures*, which are exegetic comments on Bible passages. There we read:[2]

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[1] This passage (which almost justifies the theory of Gymnosophists) exists in two quotations, Clem. Rom., ii. 12, and Clem. Alex. Stromata, iii. 6, 9, 13. The words in parenthesis are missing in the latter, otherwise the quotation is of the former.

[2] *Ante Nicene Christian Library*, Vol. XXIV, pp. 115–135.

"The life of the Gnostic rule is pure from every evil deed, and thought, and word; not only hating no one. but beyond envy and hatred and all evil-speaking slander." (xxx.)

"Lead turns white as you rub it, white lead being produced from black. So also scientific knowledge (Gnosis) shedding its light and brightness on things shows itself to be in truth the divine wisdom (sophia), the pure light which illumines the men whose eyeball[1] is clear unto the sure vision and comprehension in truth." (xxx).

"Gnostic virtue everywhere is good and meek and harmless and painless and blessed and ready to associate in the best way with all that is divine, etc.

"As cures, and prophecies, and signs are performed by the agency of men God working in them so also is Gnostic teaching." (xvi.)

Eusebius, the father of Church history, still preserves much of the Gnostic spirit and characterises Christianity in terms which do not mention a belief in Jesus as Christ. The gist of Christian ethics is (*Praeparat. Evang.*, I. 4) said to be:

"That the whole human race might receive a divine and pious education and that it might learn to bear nobly and with a profound mind the wrongs of adversaries, and that it would not defend itself against the bad with their own methods, that they should master wrath, and hatred, and all wild passion, that they should also communicate of their affluence to the poor and the needy; that they should esteem all mankind as kin, and should recognise the so-called strangers by a law of nature as a neighbor and a friend."

The differentiation of Christianity and Gnosticism becomes the more complete, the more the Church doctrines harden, and may be said to have reached its climax in the days of Constantine. Plotinus is a Gnostic who is consciously opposed to Christianity which he knows only as the vulgar dogmatism of the state religion of the Roman Empire.

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When we propose to consider the influence of Gnosticism upon the early Church we had best begin with the man whose personality and writings are historically best assured—viz., the Apostle Paul.

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[1] This phrase reminds us of a similar expression in the Buddhist canon which occurs in the *Mahâvagga*, I. ii., in the famous passage with which Buddha sends his disciples into the world. The words referred to read: "There are beings whose eyes are scarcely covered with dust," etc.

The doctrines of the Apostle Paul are the product of several factors:

"First he sat at the feet of the Pharisee Gamaliel" (Acts xxii. 3). In Gamaliel's school Paul acquired his method which is throughout dominated by the stern logic of Pharisaism attempting to comprehend all things by contrasts, such as Messiah and Satan, this world and the life to come, the curse of justification by works and the bliss of grace, the cup of the Lord and the cup of devils, the flesh and the spirit, damnation by works, and salvation by faith, etc.

The second factor in St. Paul is his Gnosticism which he must have imbibed with the spiritual atmosphere of his age, perhaps during his youth while living at Tarsus in communication with Jewish and Gentile thinkers, the thoughts of all being tinged with such ideas as Gnosis, the three spheres of being, the pneumatic or spiritual life, the psychic or animal soul-life, and the hylic or material existence. And indeed Paul's philosophy is considerably more Gentile than the theories of Philo and other Alexandrian Jews. Paul's psychology is not Jewish; neither can it be traced in Pharisaical schools nor has it been acquired among the Christians at Jerusalem whose religious interests are concentrated on problems of a different nature. It may be and probably is original with Paul, but this much is sure, that the psychological problems themselves and the terms which he used were suggested to him by Gnostic speculations. His doctrines are based upon the definitions of flesh (*σάρξ*) and body (*σῶμα*), the latter being the organisation of the flesh; the psychic body (*σῶμα ψυχικόν*) and the higher pneumatic body (*σῶμα πνευματικόν*); understanding (*νοῦς* or *νόημα*), reflexion (*διάνοια*), and conscience (*συνείδησις*); the corporeal (*σωματικόν*) and the incorporeal (*ἀσώματον*). This nomenclature does not belong to the language of Jerusalemitic Christianity; we must seek the history of these terms in Greece and shall find analogous expressions in the works of Neo-Platonic and other Greek philosophers, among whom we must include such Romans as Seneca who learned their philosophy in Greece, not in Rome. If we find a similarity between Paul and the wisdom literature of the Jews, it

is simply because the wisdom literature is also tinged with Gnostic thought.

The third factor in Paul's life is the Christophany—a sudden shock which he received on the road to Damascus, changing the direction of his entire life and bringing about his conversion. The same energy with which he had prosecuted the Christians is now devoted to spreading their cause. No doubt this Christophany is the assertion of a long suppressed conscience, and of the horrors which he must have felt while putting Christians to death, while he could not help admiring their heroic martyrdom. Important as this one moment is in Paul's life in changing the direction of his zeal, it contributes to the make-up of his soul little or nothing that is new; he received no additional information of any kind concerning the historical Jesus except this one idea: that Jesus was the Christ, that he died for our sins, was buried and had risen on the third day and appeared to the twelve apostles and other disciples. The burden of Paul's message is that Christ was glorified because he had been crucified. Paul had learned to appreciate the grandeur of martyrdom, and so the disgrace of the capital punishment of Jesus, which was still regarded among his disciples at Jerusalem as "a stumbling-block," had come to be an argument in his favor. It became to St. Paul an evidence that his was the glory in which the Gnostic longings of the time should find their πληρῶμα, or fulfilment. It is noteworthy that Paul does not mention a single individual event of Christ's life, except the institution of the Lord's supper, which was probably a common brother-meal called ἀγάπη (such as was celebrated by the Therapeutae) in which the food was blessed, and in this form it must, together with baptism which was borrowed from the Zabians, be regarded as a Christian custom from the beginning of the Church. Otherwise Paul directly repudiates having received any instruction from the apostles and personal disciples of Jesus. He says:

"I neither received it [the Gospel] of man, neither was I taught it, but by the revelation of Jesus." (Gal. i. 12.)

When we bear in mind that Gnosticism in all its essential features is a movement which in its beginnings precedes Christian-

ity, we shall understand how it is possible for the first Apostles Paul and Barnabas to meet so many men of kindred aspirations. In Troas, where Paul and Barnabas abode seven days, the Acts inform us that Paul spoke "upon the first day of the week when the disciples came together to break bread," which suggests that these disciples had reunions on the day of the sun, the first day of the week, such as were customary among the Essenes and Therapeutæ on the seventh day. In various places the apostles met with men (Simon of Samaria, Acts viii; Apollos of Alexandria, Acts xviii. 19, see also 1 Cor. i. 12, iii. 4; Elymas the Sorcerer, Acts xiii. 8) who, according to all we know of Gnosticism, were Gnostic teachers. There are also "vagabond Jews," the sons of Sceva, mentioned in Acts xix. 13, who practised exorcism and at once adopted the name of "Jesus whom Paul preacheth," for their cures. Simon and Apollos hail the apostles as friends and co-workers. Simon (commonly called Magus) is described in the Acts as "A great one to whom they all gave heed, from the least to the greatest, saying, This man is the great power (*δύναμις*) of God."—Acts iii. 10.

This Simon believed also and was baptised. He excited the wrath of Peter, however, by offering him money for receiving the power of communicating the Holy Ghost. But on being rebuked by Peter, he at once sees his mistake and says, "Pray ye to the Lord for me." (Acts, viii. 24.)

Aquila, one of Paul's disciples, had been an adherent of some Gnostic system before his conversion, for we read in Acts xviii. 18, that he had "shorn his head in Cenchrea, for he had a vow." We must remember that the tonsure is an ancient Indian institution which continued among the Buddhist monks and may very well have been practised by some Gnostic sects.[1]

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[1] No doubt, there were various Indian practices prevalent in those days which have not been mentioned in the New Testament, but were adopted by the Christians as a matter of course. Of this the use of the rosary is one of the most remarkable instances. The rosary is a product of Brahman piety, and existed long before the origin of Buddhism in India. The Buddhists adopted it from the Brahmans, and at present it can be found among all the religions of the world which have ever directly or indirectly come in contact with India, except the Protestant Christians who discarded it at the very outset of the Reformation.

Elymas, the sorcerer, is condemned because he "withstood" Paul; and we read that Paul punished him by making him blind for a season. (Acts, xiii. 11.)

Among the Gnostics of those days there were many whom we should now call faith-cure healers, and Paul is credited with the same healing power, only he is said to have performed miracles, while Elymas and the seven sons of Sceva are called sorcerers and exorcists. We read:

"And God wrought special miracles by the hands of Paul: so that from his body were brought unto the sick handkerchiefs or aprons, and the diseases departed from them, and the evil spirits went out of them." (Acts, xix. 11, 12.)

When St. Paul came to Ephesus, we are told in the Acts, that he found some of "them who were baptised in St. John's baptism," the main difference being that they had not as yet heard of the Holy Ghost and the practice of laying on hands as a means of receiving the Holy Ghost, who would enable them to speak in tongues and to prophesy.

It is difficult to understand how the doctrines of St. John the Baptist, who is reported to have been only six months the senior of Jesus, could spread so much quicker over the whole Roman empire than Christianity, but we must remember that the baptism of St. John may mean the same kind of baptism; it may mean the baptism of that sect to which St. John the Baptist belonged; for St. John was not the founder of a new sect, but the leader of an established religious movement, and there can be little doubt about it that St. John was a Zabian.

The word "Zabian" is derived from the Hebrew or Aramaic root צָבַע *tsabha*, to baptise, and the Zabians were called by Greek authors Baptists, (*βαπτισταί*) or Disciples (*μαθηταί*). They were perhaps closely related to the Nazarenes, Ebionites, and Essenes, and like them were total abstainers from wine and meat, living either as hermits in the desert on purely vegetable food and wild honey, or in congregations of monastic communities, rejecting bloody sacrifices, objecting to taking oaths beyond the simple affirmative *yea, yea*, or *nay, nay*, and believing in chastity, abstinence, and poverty as the main means of salvation.

Apollo of Alexandria, who was gained for the Pauline view of Christianity by Aquila and Priscilla, was one of these Gnostic teachers of the sect of the Baptisers. We read in the Acts, xviii. 25: "Being fervent in the spirit, he spoke and taught diligently the things of the Lord." In his philosophical views and religious practices he agreed splendidly with Paul, but he was not informed on the latest development of the Baptisers' movement. It is stated in the same verse that "he knew only the baptism of John."

Neander says in his great and learned work *Allgemeine Geschichte der christlichen Religion und Kirche*, I., p. 207, footnote 3:

"This sect of the Zabians (*βαπτισταί*), Nazarenes, Mandaeans (according to Norberg from מנדע *μαθηταί* or *γνωστικοί*) apparently originated in its first germs from such disciples of John the Baptist as, against the spirit and doctrine of their master, assumed after his martyr death a tendency that was hostile to Christianity."

Here Neander, the greatest authority in Church history, implicitly acknowledges the pre-Christian existence of Gnostic sects. But would it not be historically more exact to say, that the Zabians who showed a hostile spirit toward Christianity were those disciples who had remained faithful to the narrow doctrines of their sect, and did not accept the doctrines of the Christian Church which was a consistent evolution of their movement?

It is strange that Paul who is the first Christian apostle to the Gentiles, wrote to the Romans and addressed his epistle "to all the beloved ones of God in Rome, the called saints."[1] These saints are commonly supposed to be Christians. But if this assumption were justified, we should be puzzled as to why Paul did not address the letter to the Christian congregation or to their bishop. There were many disciples of Paul in Rome, and Paul sends greetings to every one of them. They met at the house of Priscilla and Aquila and were apparently on good terms with the congregation of "Saints" to whom the letter is addressed. Still, that the "Saints of Rome" are requested to greet the "Church which assembled in Priscilla's house" (xvi. 5), proves that the two are different institutions. Paul addresses all other letters in definite

[1] *πᾶσι τοῖς οὖσιν ἐν Ῥώμῃ ἀγαπητοῖς θεοῦ, κλητοῖς ἁγίοις.*

terms "unto the Church of God" (1 and 2 Cor. and Thessal.), "to the Churches of Galatia," "to the Church of the Thessalonians," always indicating that he addresses Christians.

Paul expressly states (i. 6) that the Holy Ones in Rome to whom he addresses the letter, are together with all the nations "called of Jesus Christ,"[1] which implies that as yet they had as little embraced Christianity as the mass of the nations; and in closing he prays that "glory be to Him that is of power to establish you according to my Gospel and the preaching of Jesus Christ" (*τῷ δὲ δυναμένῳ ὑμᾶς στηρίξαι*). Paul says "God has the power to make you followers of the Gospel which I preach; he can firmly establish you therein" (*στηρίξαι*); and this implies that the Hagioi of Rome, addressed in the Epistle, are not as yet Christians.

The term "saint" is one of those names which in the days of Gnosticism applied generally to those who took an active part in the movement. The word signifies one who has hallowed his life and has chastened himself and finds the highest moral idea in sexual purity. It reminds us of the Essenes whose name Philo interprets as "the saintly ones" (*ὅσιοι*).

The probability is that the saints here addressed were an important society of Gnostics who, for all we know, actually called themselves "the Saints" or "the Holy Ones." In fact there is a difference between "Saints" and "Christians," Christians being such saints as founded their faith on Jesus Christ. Paul himself makes this difference, for he addresses his letter to the Ephesians both "to the saints which are at Ephesus and to the faithful in Christ Jesus."[2]

The name "Hagios," Saint or Holy One, was frequently used in Gnostic times as the name of religious societies, and remained long in use together with the term "Gnostic" as a synonym of "Christian." The Roman society of Hagioi must have been the

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[1] *κλητοὶ Ἰησοῦ χριστοῦ.*

[2] *τοῖς ἁγίοις τοῖς οὖσιν ἐν Ἐφέσῳ, καὶ πιστοῖς ἐν Χριστῷ Ἰησοῦ.*

A similar double address is given to the Colossians, but the grammatical construction does not render the distinction between the Hagioi and the Christians as unequivocal as in the Epistle to the Ephesians.

centre of a great number of similar societies in the provinces, which would render a conversion of their members the more desirable, and this explains why Paul wrote to them an epistle that contained the trend of his message to the world.

The prevalence of Oriental sects in Rome is well attested by Tacitus who mentions two prosecutions of foreign religions under Tiberius, one of the astrologers and magi and the other of the Egyptians and Jews, the latter being mentioned in detail by Josephus.[1] Even the better classes were affected by the spirit of the age, and Stoics as well as Pythagoreans offered philosophical doctrines which were closely allied to the Gnosticism of Syria. Seneca tells us that ever since he attended, in his youth, the lectures of Attalus, he had abstained from wine and had never used unguents. Indeed, he once went for a time so far as to forswear all flesh diet, the viciousness of which the philosopher Sotion had impressed on his mind. Some of the new doctrines must have deeply impressed the young Seneca,[2] and it is quite probable that the most striking similarities between his philosophy and Christianity will find an historical explanation since both have originated at the same age and under the same influences, which we comprise under the general name of Gnosticism.

The sole objection to the view that the Romans addressed in the Epistle were not as yet Christians seems to be in the words employed in Rom. xvi. 17, "contrary to the doctrine which you have learned." But was not brotherly love an ideal common to all Gnostics, Christians as well as heretics? And mark that Paul at once changes the *ye* (ὑμεῖς) into *our* (ἡμῶν) when speaking of Christ (τῷ κυρίῳ ἡμῶν). Nor does Paul praise the faith of the Romans; he extols their open-mindedness, their willingness to hear all sides, their receptiveness, which he calls ὑπακοή. Open-mindedness after the conversion would have the flavor of fickleness.

If the Hagioi at Rome had been Christians it is not likely that Paul would have omitted to mention the fact; and if they were

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[1] *Ann.*, II. 32 and 85, Josephus, *Jewish Antiqu.*, 18, 3 et seqq.

[2] See his 108th letter.

familiar with the name of Jesus Christ, why did Paul deem it necessary in the very opening words of his Epistle, where he defines his own apostleship, to give a long explanation of the significance of Christ as announced by the Prophets (verse 2), of his being of the seed of David after the flesh (verse 3), of his being marked off (ὁρισθείς) as the son of God according to the spirit of holiness by his resurrection from the dead (verse 4)? Mark that holiness is here supposed to be the cause of Christ's resurrection, which is a thoroughly Gnostic idea and can scarcely be regarded as conforming to the views of the early Christians, who would certainly derive the virtue of holiness from the divine nature of Jesus. Jesus had not become the Christ by his holy life, but he was born as Christ, and therefore he remained holy; he lived, died, and rose again as Christ.

Paul was fully conscious of his relation to the Gnostic movement; he knew that to some extent he agreed with Gnosticism; but he also knew that Christianity was a rival movement of the Gnosis. He does not reject the Gnosis when addressing Gnostics. Thus he says in his Epistle to the Romans, xv. 14:

"And I myself also am persuaded of you my brethren that ye also are full of goodness, filled with all Gnosis and able also to admonish one another."

Yet he deems the non-Christian Gnosis insufficient and warns Timothy to avoid the babblings and contentions of "the falsely so-called Gnosis" (ψευδώνυμος γνῶσις, 1 Tim. vi. 20). He insists on the love of Christ as passing the Gnosis (Eph. iii. 19), and writes to the Colossians (ii. 8):

"Beware lest any man spoil you through philosophy."

Philosophy can signify nothing else but Gnostic speculations. Mansel sums up the conditions among the Colossians, which the Epistle presupposes, as follows. He says:

"The Epistle to the Colossians, which was written at the same time with that to the Ephesians, contains, however, more distinct indications of the existence of Gnostic errors among those to whom it was addressed.

"The characteristics of this teaching may be easily gathered from evidence furnished by the language of the Epistle. First; it pretended, under the plausible

name of *philosophy*, to be in possession of a higher knowledge of spiritual things than could be obtained through the simple preaching of the Gospel. Secondly; it adopted the common tenet of all the Gnostic sects, that of a distinction between the supreme God and the Demiurgus or creator of the world. Thirdly; by virtue of its pretended insight into the spiritual world, it taught a theory of its own concerning the various orders of angels and the worship to be paid to them. And fourthly; in connexion with these theories, it enjoined and adopted the practice of a rigid asceticism, extending and exaggerating the ceremonial prohibitions of the Jewish law, and probably connecting them with a philosophical theory concerning the evil nature of matter." *Gnostic Heresies*, p. 53.

What do all these references to Gnostic heresies in Paul's epistles prove if not their existence and prevalence?

The divisions in the Church of Corinth, mentioned by Paul in the First Epistle to the Corinthians, are schisms which exhibit all the features of post-Christian Gnosticism, but they too indicate the prevalence of a pre-Christian Gnosis. The followers of Cephas are presumably nomistic or judaising Christians, while the followers of Apollos are former Gnostics who had been gained for the new problems by the Gnostic teacher Apollos. Further, those who called themselves after Christ, too, must have interpreted the Christian doctrines, such as Paul preached them, in the light of their pre-Christian Gnosticism, for their view of the resurrection was less carnal and more spiritual than Paul's.

We have dwelt at length on the traces in the New Testament that speak in favor of the prevalence of Gnostic sects at the time when Paul began to preach, because these traces will be more readily accepted than any other historical evidences and because their importance, strange to say, has not as yet been appreciated by Biblical scholars.

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Among the personalities mentioned in the New Testament in connection with the spread of the early Church, Simon Magus is of special importance, because we know more of him through other sources than we do for instance of Apollos.

We have no reason to doubt the historic character of the report concerning Simon Magus in the Acts, although the friendly relations between Simon and the Apostles appear in a doubtful light

when we consider the opinion of the Church fathers. He is commonly condemned as a heretic and sorcerer whose doctrines are brought into close relation to various Gnostic sects. But the difficulty disappears when we consider the situation of the early Church seeking contact with other parallel movements of its age. Simon Magus was a friend of the early Christians; their doctrines were sufficiently similar to lead to a close alliance and amicable discussions of the problems in which both were interested. But Simon Magus left writings of his own which were still extant when Justinus Martyr wrote his *Syntagma*, from which Hegesippus Hippolytus, Eusebius, Jerome, Irenæus, and other Church authorities drew their information; and the more the consolidation of the Church became an established fact, the more Simon was condemned by Christian writers as a heretic. We can form a fair opinion of the heresies of Simon Magus, when we understand that his relation to Peter was quite analogous to the relation of Apollos to Paul. It is interesting to notice the similarity of Simon's views to Philo's philosophy and to the Gnostic doctrines of later teachers. Simon regarded himself as the Logos or divine word, and Jerome quotes from his writings the following passage:

"I am the speech of God, I am radiant, I am the comforter (paraclete), I am omnipotent, I am the whole of God."

"Ego sum sermo Dei, ego sum speciosus, ego paracletus, ego omnipotens, ego omnia Dei."[1]

Irenæus reports similar views of Simon, stating "that he was the sublimest virtue, i. e., he who was father over all."[2] The same author informs us that Simon identified himself with the trinity, and he taught that God had appeared to the Samaritans as the Father, to the Jews as the Son, to the Gentiles as the Holy Spirit.[3] If Irenæus has drawn this statement from a genuine writing of Simon

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[1] The term "Sermo Dei" is apparently a translation of Divine Logos.

[2] Esse autem se sublimissimam virtutem, hoc est eum qui sit super omnia pater.

[3] Irenæus c. *Haer.* I. 23. Cf. Hippolytus *Ref. Haer.* vi. 19, and *Theodoret Haer.* Fab. I., 1.

Magus, we should be confronted with the interesting fact that the names of the Christian Trinity were first used by a pre-Christian Gnostic teacher.

These quotations in which Simon identifies himself with God, the father of all things, may or may not have been intended as personal references. Simon may have understood them in the sense of similar Vedanta doctrines in which the self is identified with the Allhood of the Brahm. For Simon apparently was ready enough to recognise Jesus as a God-incarnation greater than himself. For our present purpose, which is to characterise the general features of the Gnosis and to prove its pre-Christian existence, details are of little consequence. The most startling fact is that Simon uses terms which strongly remind one of Philo, while there is little probability that he borrowed from Philo. We cannot, accordingly, escape the conclusion that Simon and Philo, as well as other Gnostic teachers such as Apollos, were children of the same age, which renders the remarkable resemblance of all Gnostic sects a matter of course.

That Simon was not the oldest Gnostic was well known to the Church fathers, for Hippolytus (v. 2–5) expressly states that the Naaseni or Ophites, the Peratae, the Sethiani, and the adherents of Justin (who of course is not Justinus Martyr) existed before Simon, which renders it probable that he derived his doctrines from the older Syrian Gnosis.

The late Henry Longueville Mansel, whilom Dean of St. Paul's in London, and Professor of Ecclesiastical History at Oxford, may be right in interpreting the word power or *δύναμις* in Acts viii. 9–10 in its special Gnostic significance, and he says that when we adopt the reading *Οὗτός ἐστιν ἡ δύναμις τοῦ θεοῦ ἡ καλουμένη μεγάλη* (This is that power of God which is called great) we obtain a clearer insight into the pretensions of Simon. At any rate, it is probable that the term *δύναμις*, power, is here used in its peculiarly Gnostic significance.

Simon is reported to have regarded himself as an incarnation of the Logos; he taught that from the invisible the incomprehensible Power Silence came two offshoots having neither beginning

nor end, of which one—the *νοῦς* or Intellect—is manifested from above as the male principle, the other *ἐπίνοια* or thought, from beneath as the female principle. This mysterious Trinity[1] is the Father, himself bi-sexual, that is the eternal upholder of all things transient, being he who standeth, who stood, who will stand without a beginning and without end.[2]

Vestiges of non-Christian Gnosticism, i. e., of Gnostic views rejected by the Church are frequently found in the New Testament Apocrypha. It is, for instance, a Gnostic fashion when Jesus is called the first æon in the *Pistis Sophia* and also when the Gospel of St. Peter interprets the cry of Jesus on the cross, *Eli, Eli*, as "my power, *ἡ δύναμίς μου*."

The influence of Philo's Gnosticism on the author of the fourth canonical Gospel has been frequently pointed out and there is no need of further arguments to prove it. It is of less account for our present purpose, because the Fourth Gospel is much later than Paul and shows frequent traces of Pauline influences. The author of the Fourth Gospel represents a more matured Christianity than the Synoptic Gospels, but he neglects the historical standpoint. In his days the differentiation between Jewish Christianity as represented in the Revelation of St. John the Divine and Hellenic Christianity as inaugurated by Paul and first applied to the Gospel story by Luke, had become complete. Both parties now ceased to understand one another, and the disappearance of Jewish Christianity made an end of the conflict, leaving the field undisputed to the Hellenists.

Hellenic Christianity introduced all the ideals of the broader Hellenic Gnosis and superseded the narrower Jewish Gnosis. The chiliasm of the Jew-Christians, its hopes of a worldly restoration of the new Jerusalem with the dismal prophecies of the terrible vengeance that God would wreak on the Gentiles were superseded by a cosmic conception of Jesus as the world-logos. He is no longer called the son of David, but the light of the world, the bread of

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[1] Viz., Σιγή, Νοῦς and Ἐπίνοια.

[2] See Mansel, *Gnostic Heresies*, pp. 88–89.

life, the water of life, the vine, the shepherd, the gate, the way, the truth, and the life. While the synoptic Gospels, especially Mark, show concrete situations and a historical development of the character of Jesus; the fourth Gospel lacks all local color and represents Jesus as the same supermundane person throughout. Nevertheless the tone is more sympathetic to a Greek reader. There is no mention of obsessed persons and of lepers who play an important part in the synoptic Gospels, and fasts as well as ascetic practices which are still retained by Luke disappear. The last supper resembles more the agape, or love-feast, of the early Christians than the Jewish Passover; and all interest is concentrated upon the revelations of Jesus concerning the nature of his own divinity. While in the synoptic Gospels John the Baptist ventures to think that the new preacher in Galilee of whom he hears in prison, may be the Messiah himself, the fourth Gospel lets him speak of the dignity of Jesus from the beginning and describes minutely how he hailed him as the Messiah even before baptising him in the Jordan. A remarkable symptom of a changed situation will also be found in the characterisation of the Jews as the outspoken enemies of Christ. The fourth Gospel has probably drawn upon another and independent Gospel in addition to the synoptic Gospels, and this Gospel may in several details have been more reliable than Mark, which possibility must make us careful not to reject the account of the fourth Gospel whenever it comes into conflict with the other Gospels. Nevertheless, it is as a whole historically less reliable and reflects plainly the views and customs of the early Hellenistic Church.

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We understand now why non-Christian sects possessed institutions, rituals, and symbols, which were quite similar to those of the Christians, and we need no longer attribute them to the malignity of Satan, who apes the Lord's sacraments. On the contrary, we shall now be able to learn why many features of Christian institutions, such as the rosary, the mass, and other liturgic rites, developed in the Church without even having any foundation in the New Testament. The rites of Mithras were so commonly estab-

lished in the days of Justinus that he refers to them as well known. Justinus says:

"For the apostles, in the memoirs composed by them, which are called Gospels, have thus delivered unto us what was enjoined upon them; that Jesus took bread, and when he had given thanks, said, 'This do ye in remembrance of me, this is my body'; and that, after the same manner, having taken the cup and given thanks, he said, 'This is my blood;' and gave it to them alone. Which the wicked devils have imitated in the mysteries of Mithras, commanding the same thing to be done. For, that bread and a cup of water[1] are placed with certain incantations in the mystic rites of one who is being initiated, you either know or can learn." *Anti-Nicene Christian Library*—Justin Martyr, p. 65, Vol. II.

The rites of Mithras continued in rivalry with Christian institutions and were still flourishing in the days of Tertullian, who in his book *On Prescription Against Heretics* speaks of "the Devil to whom pertain those wiles which pervert the truth and who by the mystic truths of his idols, vies even with the essential portions of the sacrament of God." Tertullian continues:

"The Devil whose business it is to pervert the truth, mimics the exact circumstances of the Divine. He (viz., Satan) too, baptises some, that is, his own believers and faithful followers[2]: he promises the putting away of sins by a laver [of his own], and if my memory still serves me, Mithras there sets his marks on the forehead of his soldiers: celebrates the oblation of bread; and introduces an image of resurrection and under the sword a crown." *Anti-Nicene Christian Library*,—Tertullian, Vol. II.

"What also must we say to his [Satan's] limiting his chief priests to a single marriage?[3] He, too, has his virgins; he, too, has his proficients in continence." (*Ibid.*)

These passages prove that the Gnostics of the Mithras sect not only aspired after the same religious ideals, viz., forgiveness of sins,

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[1] The use of pure water for the Lord's Supper in the churches of Northern Africa is well established through the 63d letter of Cyprian, and, says Harnack, "the same custom is reported of the Ebionites, Gnostic Jew Christians, Tatian, Encratites, Marcionites, and the Apostolics." (*Brod und Wasser. Die Eucharistischen Elemente bei Justin.* Leipzig. 1891. P. 117–118.)

[2] Compare Tertullian's treatises *De Bapt.*, 5, and *De corona*, last chapter.

[3] Tertullian (in his treatise *Ad uxorem*, 7) regards second marriage as "obstructive to holiness." He adds: "Priesthood is [a function] of widowhood and of celibacies among the nations. Of course [this is] in conformity with the Devil's principle of rivalry. For the king of heathendom, the chief pontiff (the Pontifex Maximus), to marry a second time is unlawful."

and an assurance of the immortality of the soul, as did the Christians, but that they also used symbols and sacraments which were exact analogies of the Christian baptism and the Lord's Supper. Even the moral aspirations are similar. There is no probability of a mutual borrowing; and if there were, it would be easy to prove that the rosary, baptism, and even mass, are pre-Christian institutions. The cup and the bread of Mithras are apparently derived from an ancient Zarathushtrian ceremony. We read in the Zend-Avesta[1] that "the sacred cup and the haoma are the best weapons to strike and repel the evil doer Angra Mainya." Darmesteter says that "Haoma" is the Vedic "Sôma," the drink of the gods; and the holy food of the Myazda was small pieces of meat eaten on little cakes called "draoma," consecrated in the name of deceased persons, corresponding to the Vedic "hotrâ." And it is stated that he who drinks of the white haoma (or Gas-Kerena) will on the day of resurrection become immortal.[2]

The name of Mass is commonly derived from the Latin *missa est*, which is interpreted to mean that "the congregation is now dismissed"—an etymology as absurd as the absurdest derivations of the ancient philologists. There is a probability that the word mass is the Latinised form of Myazda, if it be not the Hebrew מַצָּה (mazzah)[3], the unleavened bread eaten by the Jews at the Passover festival. For all we know the word mazzah may be the Persian Myazda, which gains in probability if the main characteristic features of the Jewish festival of the unleavened bread is to be regarded as of post-exilic origin and the historical interpretation as added thereto, a method which is systematically applied to all the sacred days of the Jewish calendar.

As an instance of a festival adopted by the Jews from the Babylonians and interpreted by a story of later invention we quote the feast of Purim which in the times when the book of Maccabees was

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[1] See *Sacred Books of the East*, IV., p. 206.

[2] See Darmesteter's "Introduction to the Zend-Avesta" in *Sacred Books of the East*, Vol. IV., p. lxix., and also note on p. 56.

[3] The צ in *mazzah* is a sharp *ts*,

written was called "Mordecai's Day" and appears to have been nothing else but the festival of the Babylonian god Marduk, the slayer of Tiamat, the old dragon, while Esther is the goddess Ishtar. The Babylonian festival assumed gradually a distinctly Jewish character, and thus, says Professor C. H. Toy of Harvard, in his article on "Esther as a Babylonian Goddess," "the science of the old myths becomes history to later generations."

Nor must we lose sight of the fact that the Roman Catholic mass is even to-day spoken of as a sacrifice and is celebrated in a way which reminds us of the Gnostic aspirations to replace the bloody sacrifices by symbolic victims. The bread is called the *hostia*, viz., *Opferthier*, or victim to be slaughtered on the altar. It is not of bread, such as is daily eaten, but of an unleavened paste, called *oblata* or the offering, and is always of a circular shape reminding one of the disc of the sun.

C. W. King in his book *The Gnostics and Their Remains*, p. 53, quotes from Alphonsus de Spira in his *Fortalicium Fidei* (II., 2):

> "That its (the wafer's) circular form is a symbol of the sun and that it is offered to the genius of that luminary as a victim. For the Talmudists hold that Abraham and the prophets were inspired by the genius of Saturn, a good and pure spirit; but Jesus by that of Mercury a malevolent one; and the Christian religion was the work of Jupiter, Mercury, and the Sun, all combining together for the purpose."

The Rabbinical view, of course, is inimical to Christianity; the more noteworthy, therefore, is the reference to the sun as a Christian planet, for the sun is always regarded by astrologists as the best and most divine star, and we must remember that the sun's day was commemorated from the beginning of the Church as the day of resurrection.

It will be instructive to compare Christianity with those Gnostic movements which refused to amalgamate the fundamental principles of the Gentile Gnosticism with the Jewish religion. The anti-Jewish Gnosticism died out together and perhaps simultaneously with Jewish Christianity, and thus the Hellenised Christianity alone survived.

In order to explain the success of Christianity as a Jewish

Gnosticism Hellenised, we must bear in mind that the Jews were the sole people among the nations of antiquity that possessed a religious canon.

The claims of the Jews to being entrusted with a special revelation from on high appeared justified by their simple and yet exceedingly practical solution of the religious problem. Their God-conception was popular and appealed to the Greek minds who had long been prepared by Plato and other philosophers to have a contempt for the traditional temple service and polytheism. The moral seriousness of the prophetic literature could not fail to leave a deep impression on any Gentile reader, and thus no religious movement could succeed which did not ally itself with the fundamental principles of the Jewish faith. Nevertheless Judaism itself in the narrow form of Pharisaism could not conquer the world. The national pretenses of the Jews together with their ritual were too offensive to the Gentiles. The Greek naturally held circumcision in abhorrence. Gentile Christianity selected from Judaism everything that agreed with the cosmical and universalistic tendencies of the Gnostic movement of the age and made its peace with the rest, rejecting the Jewish rituals and Levitic law as antiquated but respecting their historical importance as having served God's educational purposes in the history of the evolution of Christianity.

The truth of this view will be corroborated by a consideration of those Gnostic movements which failed to adapt themselves either to Judaism or Hellenism. The Jewish Christian Church appears to have existed under the name of Ebionites or Nazarenes until the time of Origen, but they had ceased to affect the further evolution of Christianity. The Revelation of St. John the Divine is the last monument of their spirit, and even that book became more and more unintelligible and enigmatic. It has never been universally regarded as canonical, and it kept its position in the canon mainly because its attacks upon Gentile Christianity, especially on Paul whose apostleship is not acknowledged, were not openly and ostensibly made but remained concealed in hints which, though plain enough, were less offensive.

As an instance of Gnostic movements which ignored Judaism

we mention the commotion created by Apollonius of Tyana, and of those sects which rejected it, the Ophites.

Apollonius, born shortly before the Christian era, made a deep impression upon the Gentile world, and even during his life-time was credited by his followers with being possessed of miraculous powers. The resemblance of his life to the life of Jesus is the main reason that Christian fanatics destroyed as much as possible of the documents bearing witness to the great influence which he exerted upon his contemporaries. By a happy accident Philostratus's biography of this remarkable man escaped the persecution of Christian monks, and we learn from it that Apollonius may fairly be regarded as a Gentile Christ. It seems that the religious spirit of the age was bound to have an incarnation of the Deity who would reveal to mankind the mysteries of the soul and establish his divine mission by a holy life, by long suffering and submission to persecution, and by miracles which would prove him to be beyond the power of death. Apollonius, however, was a pagan, and his whole personality is purely Gentile; he looked upon the worship of the Greek gods as a significant symbolism serving a good purpose in the religious education of the masses, but he lacked the backing of the powerful Old Testament traditions which, as we have seen, naturally became the indispensable condition of Christhood.

Philostratus tells us that Apollonius, having studied philosophy at Tarsus (the native town of the Apostle Paul) and medicine, or rather therapeutics, in the temple of Æsculapius, at Ægæ, observed with rigor the discipline of the Pythagorean school and then went out to study the wisdom of the East. He wandered on foot through Assyria, Persia, and India, and conversed with the sages and priests of those countries, insisting everywhere on a purification of morals and religion.

At Nineveh he met Damis who became his disciple and the constant companion of his after life, but the miracles which he tells of having witnessed are so marvellous that there are critics who even doubt whether Apollonius himself was not a purely mythical figure. Supposing, however, that the whole life of Apollonius was actually a myth, we should still have the remarkable fact that such

a myth originated contemporaneously with Christianity; for the hypothesis that the figure of Apollonius was invented in imitation of the Christ-ideal of the Christian Gospel has no plausibility. Apparently we are confronted with a strange parallelism.

Apollonius attains his perfection through his visit to the Hill of the Sages, whence he returns to the West to continue his work of preaching, prophesying, healing, summoning spirits, and restoring the dead to life. He visited all the countries of the Roman Empire and its capitals, including Rome where he was received with great honors. He ended his career at Ephesus, and Philostratus ends his book with a suggestion that he may continue to live somewhere else in a more spiritual form of existence, saying, "Concerning the manner of his death, if he died at all, the accounts vary."

The *Encyclopedia Britannica* sums up the situation of the influence of the figure of Apollonius on history as follows:

"After his death Apollonius was worshipped with divine honors for a period of four centuries. A temple was raised to him at Tyana which obtained from the Romans the immunity of a sacred city. His statue was placed among those of the Gods, and his name was invoked as a being possessed of superhuman powers. The defenders of paganism, at the period of its decline, placed the life and miracles of Apollonius in rivalry to those of Christ, and some moderns have not hesitated to make the same comparison. There is no reason to suppose, however, that Philostratus entertained any idea of this sort in composing his life of Apollonius."

Among the anti-Jewish Gnostics, the Naassenes[1] or Ophites are probably the most interesting and curious example.

The Ophites are a Syrian sect. They called themselves Gnostics (as Hippolytus informs us), but are spoken of as serpent-worshippers by the Church fathers who were at a loss how to explain their peculiar preference for the serpent that tempted Eve, and their disdain of Jahveh, the creator of the world and God of the Jews. Dean Mansel with his limited historical knowledge stands aghast at this "inversion of the whole teaching of Scripture, in calling evil good, and good evil," and speaks of it as a "portentous

[1] From Hebrew נָחָשׁ or Greek ὄφις, i. e., serpent.

blasphemy." Indeed, the Ophite views are startling for any one who takes the view that Gnosticism is a mere perversion of Christian doctrines. But when we approach the subject with the better comprehension which we now possess of the religions of ancient India, we can easily account for the logic of this strangest of all heresies that apparently makes Satan change places with the Lord.

The original doctrines of the Ophites, as stated by themselves, are lost. We know only what they thought of the Old Testament and of Christianity. They were Gnostics and like other Gnostics distinguished between the material, the psychical, and the spiritual man. They believed in the Gnosis, or salvation by enlightenment, and salvation meant a deliverance from this material world. The world-builder was, according to their religion, the evil power who entices the souls into his snares by blinding them with ignorance. In this way souls become material and lose their spiritual, perhaps even their psychic powers. He, however, who attains to a full possession of the Gnosis, a Messiah, Buddha, a Christ, a pneumatical man, one who is perfectly spiritualised, liberates himself from the fetters of matter.

When the members of this sect became acquainted with Judaism, they pointed out that Jahveh was not the highest God. The highest God of the Ophites was (according to Irenæus) a trinity consisting (1) of the Father, who like the Adam Kadmon of the Cabala is the prototypal spiritual man, (2) of the Son also called reason or comprehension (ἔννοια), and (3) the Spirit which latter is represented as the female principle of spiritual generation. Mansel says in comment on this doctrine (*Gnostic Heresies*, p. 98):

"It is impossible to overlook in this representation a profane parody of the Christian doctrine of the Holy Trinity."[1]

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[1] The zeal of the venerable Dean for the Trinity doctrine, which only in later times became an established dogma of Christianity, shows itself in the remark which he adds: "Offensive as are some of the details of the theory, it is at least valuable as testifying to the primitive existence of that article of the Catholic faith from which it is borrowed." The argument proves a little too much for the preferences of Dr. Mansel; it proves the pre-Christian existence of the dogma, although we grant, in a form unacceptable to the Church, and could be definitely accepted only

Jahveh was called by the Ophites Ialdabaoth or Demiurge, the son of Sophia and Chaos (viz., matter). According to the reports of the Biblical books themselves, they claimed, the Demiurge or Ialdabaoth is a jealous God, inclined to wrath, revengeful, cruel, and lacking in the nobler moral faculties; yet they granted that after all he was not destitute of the wisdom of the All-merciful Highest God. Ialdabaoth created man and breathed into him the breath of life, implanting thereby unwillingly in his soul the seeds of wisdom. These seeds of wisdom afford man the possibility of rising above the Empire of Ialdabaoth, whose jealousy is aroused as soon as he notices his mistake. He therefore forbids man to taste of the fruit of the tree of knowledge. But the highest God, the all-wise and all-good, takes compassion upon man and sends the serpent, which animal is in India an emblem of wisdom and divine perfection, to teach man the use of wisdom, and the man ate and grew in comprehension. Then the divine wisdom appeared in various holy men, who again and again communicate to mankind the principles of the highest spiritual goodness which is nobler than the moral commands of Ialdabaoth.

Christ was to the Ophites higher than Ialdabaoth; but they distinguished between a Christ of the world of Æons, the spiritual or pneumatical Christ, and a psychical Christ. The former is similar to Buddha residing in the Tusita Heaven. He descended from the world of Æons through all the seven heavens, assuming in each one of them the form of the angels who inhabit it, and became incarnated in Jesus at the moment of baptism, staying with him during the time of his Messianic work, but forsaking him when his passion began. This theory well agrees with the Buddhist doctrine that Buddha is Bhagavat, the Blessed One, i. e., the Perfect Man, who having already in this life attained Nirvâna, is above all suffering. The Ophites had no explanation for Christ the sufferer other than to deny his Christhood. The passion itself appears to them as an evidence that Jesus was no longer a pneumatical man; he had ceased to be Christ.

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after the Christianisation of the Logos idea in the interpretation as given by the fourth Gospel.

Here lies the root of the origin of all doketic sects, which have their exact prototype in Buddhism.[1]

There were other Syrian Gnostics more or less similar to the Ophites, all of them agreeing in this that they regarded the Demiurge, who is identified with the God of the Jews, the Creator of the material universe, as an inferior deity, lavishing praise upon those personalities of Old Testament history who opposed Jahveh's authority and rebelled against his code of morals. The Cainites, for instance, believed that Cain, by his courageous opposition, greatly distinguished himself. According to Epiphanius, they say of Judas Iscariot that he alone among the apostles was possessed of the true Gnosis and maintain that his motive was pure and unselfish, for he knew that only through Christ's death could the empire of the Demiurge be overcome.[2] The Peratæ identified the serpent that tempted Eve with the Divine Word, the Logos of God.

Hellenic non-Christian Gnosticism reached its last efflorescence in Plotinus, a man who in many respects is like a Christian saint and yet is fully conscious of the contrast of his purely Gentile Gnosticism with the Hellenised Jewish Gnosticism, called Christianity, of his age. He uses the same terms which are found in the Christian Gnosis, Logos, Ousia, Pneuma, etc., but he remains,

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[1] Compare, for instance, the fragment of the *Fo-Pan-Ni-pan-King*, translated as an example of style by Samuel Beal, in his third Note to the *Fo-Sho-Hing-Tsan King*. There the Buddha, when accepting the poisonous food of Chunda the smith, declares: "Illustrious youth, for ages (Kalpas) innumerable the Tathâgata has possessed no such body as that you named, as suffering from human wants or necessities, nor is there such an after-body as you describe as eternal, illimitable, indestructible. To those who as yet have no knowledge of the nature of Buddha to these the body of the Tathagata seems capable of suffering, liable to want [but to others it is not so]." (Cf. *S. B. of the E.*, Vol. XIX., p. 367.)

[2] The good Dean Mansel rejoices that the book in which this view of the Cainites was set forth, entitled "the Gospel of Judas," has not been preserved. He calls it "a work which is happily lost." In the present days of inquiry into truth we find it difficult to understand how the early Christians could show such a great zeal in the extermination of all Gnostic writings. Here we have the last remnant of this narrow spirit. No wonder that Dean Mansel calls attention to the strange coincidences between the Ophite doctrine and Hegel's explanation of the fall of man, as the initial stage of a rise from a state of childish innocence. The Dean condemns "every attempt to represent the course of the world including man as a part of the world in the form of a necessary evolution." (*Gnostic Heresies*, p. 108).

more than the author of the fourth Gospel, conscious of their original philosophical sense. The soul according to his view is alone our true self, the body is given to the soul and is foreign to it. He was so much a dualist that he was ashamed of having a body, and would not sit for a picture. While his view of the Deity is almost Christian, his tripartition of the world into the Deity, the world of Ideas, and the sensual world of matter, reappears with slight changes in the philosophies of Christian mystics. In spite of his dualism and his contempt of all bodily existence Plotinus regards these three realms, including the third one, as a genuine divine Trinity, calling the sense-world "the only begotten son" (*υἱὸς μονογενής*) and "the image of God."[1]

The main difference between Plotinus and Christianity consists firstly in his recognition of Plato's works as a kind of divine revelation in place of the Jewish canon; and secondly, in adopting the current Gnostic notions (e. g., reincarnation) and conceiving the origin of the world as an emanation from God.

* * *

If, as we have stated at the beginning of this article, Gnosticism is older than Christianity, Christianity naturally originated from the religious fermentation of the Gnostic movement and survived in the struggle for existence all rival religions which presented similar solutions of the religious problem, and if finally we understand that we are here confronted with historical facts that are not the product of chance but result with necessity according to the law of evolution, we shall learn to appreciate the doctrine of a special dispensation of God's providence. Certainly God's providence is not such as the Sunday-school teachers explain it to their children; but after all there is a regular plan of education, a plan which is as natural and necessary as is the progress of all life, showing itself in the development of higher forms from lower forms, as the progress of invention, of science, of morality. The Jews are, in quite a special sense, a chosen people, chosen because specially fitted for realising a definite, desirable end in the evolution of reli-

[1] *εἰκων τοῦ θεοῦ.*

gion. Of course we understand now, that the Greeks too were a specially chosen people, but they were chosen for other purposes; they were not as well fitted as the Jews to make the Gnostic aspirations sober and to graft their vague theories of the soul's immortality upon the religious experiences of a nation of sufferers. Gnosticism, if it had not been aided by Judaism, would probably have lost itself in the vague dualistic speculations and extravagant practices, ecstatic visions, and ascetic discipline of which even their maturest representatives are guilty. In a combination of Gnosticism with Judaism it was easier to drop the narrowness of the Jewish prejudices than to acquire without their previous amalgamation the sobriety of the Jewish religion. The wholesome influence of the Old Testament becomes specially apparent in the history of the Reformation in England and America and in the struggle of the people against all forms of oppression.

We conclude our article with the expectation of resuming the subject in some of its special features and of carrying it into the more difficult field of the problem of the Jewish Christian Church itself on the soil of Palestine under the personal influence of Jesus of Nazareth,—of him whose life marks the beginning of a new era in the history of mankind.

EDITOR.

ASSIMILATION AND HEREDITY.

I.

THE PROBLEM of the transformation of dead matter into living matter is continually being solved by each living cell. The most striking example of this process is the bird's egg, in which during the incubation a small piece of living matter, the germ, gradually transforms the whole yolk into living matter. It is just as evident in a growing organism. The transformation of the dead matter of the food into the living protoplasm of the body causes the growth of the child. We call this process of transformation of dead matter into living matter assimilation. Should we ever attempt to produce living matter artificially, this could only be done upon the basis of a careful analysis of assimilation.

The proteids and probably all constituents of living matter are generally different in the different species. Even the layman can recognise this through his chemical senses (taste and smell). The meat of the chicken and beef has a different flavor and odor, the various kinds of game taste and smell differently, etc. It is one of the fundamental facts of assimilation that the cells of an animal transform the proteids of another animal into their own protoplasm. If we feed a young dog during its period of growth with horse meat, the horse meat will be transformed into dog's meat, and in this form it will be deposited. How does this process of transformation take place?

The proteids have a very large molecule. The formula of constitution for the proteid contained in the hemoglobin of the horse is $C_{680}H_{1098}N_{210}S_2O_{241}$, that of the hemoglobin of the dog is $C_{726}H_{1171}N_{194}S_3O_{214}$. The transformation of the former into

the latter is only possible if two molecules of horse hemoglobin are split up into smaller building stones from which, by a new way of grouping, a molecule of hemoglobin of a dog is built up. Hence we see that the process of assimilation takes place in two phases, first a phase of cleavage and second a phase of synthesis of the small building stones into a new giant molecule.

But the cleavages and synthetical processes must be different in the protoplasm of different animals. The cells of a cat, for instance, split and put together the proteid molecules of horse meat in a different way from the cells of the dog. How does living matter split up the complicated molecules of our food, and why does this happen in a manner which is characteristic of and different for each species?

We know that the cleavage of the large molecules of our food into smaller molecules is brought about by ferments. The majority of investigators assume that a ferment is a special well defined molecule, but this is by no means certain, as we have not yet succeeded in finding out the chemical constitution of any ferment. To know whether the ferments of the living animal or living plant are something which we may hope to produce artificially in our laboratory, or whether they can only be found in living matter, is one of the fundamental problems of physiology. The possibility of producing living matter artificially and of producing new animal and plant forms depends to some extent upon our success in obtaining a more definite knowledge of the character of ferments.

II.

One of the most important steps in our knowledge of the mechanics of fermentation is connected with the work of Emil Fischer on sugars. It has been known for a long time that a molecule of grape sugar is split up by yeast (for instance, Saccharomyces cerevisiæ) into two molecules of alcohol and two molecules of carbonic acid. Fischer succeeded in discovering a series of sugars which do not like grape sugar contain six atoms of carbon in the molecule, but three, four, five, seven, eight, and nine atoms of carbon. The names of these sugars are triose, tetrose, pentose, etc., to non-

ose. It was found that Saccharomyces cerevisiæ is able to ferment only those sugars which contain three, six, or nine atoms of carbon in the molecule, while the other sugars are not fermentable. Thus the fermentability is a function of the number of the atoms of carbon in the molecule.

But a much more important relation exists if we consider not only the constitution of the sugar molecule but also its configuration. The molecule of grape sugar has the constitution $C_6H_{12}O_6$. According to the various configurations of the atoms in this molecule, sixteen isomeric sugar molecules with the constitution $C_6H_{12}O_6$ (Hexaldoses) are possible, a number of which are known. By means of a number of investigations it has been established that only three of these hexoses are fermentable with Saccharomyces cerevisiae, namely, d-glucose, d-mannose, d-galactose. This dependence of fermentability upon the configuration of the molecule becomes more evident if we compare some of the formulæ of the hexoses which are fermentable with those which are not fermentable.

1. d-Glucose	CH_2OH	H C OH	H C OH	OH C H	H C OH	COH	(Fermentable.)
2. l-Glucose	CH_2OH	OH C H	OH C H	H C OH	OH C H	COH	(Non-fermentable.)
3. d-Mannose	CH_2OH	H C OH	H C OH	OH C H	OH C H	COH	(Fermentable.)
4. l-Mannose	CH_2OH	OH C H	OH C H	H C OH	H C OH	COH	(Non-fermentable.)
5. d-Galactose	CH_2OH	H C OH	OH C H	OH C H	H C OH	COH	(Fermentable.)
6. l-Galactose	CH_2OH	OH C H	H C OH	H C OH	OH C H	COH	(Non-fermentable.)

If we ask what is common to the sugars which are fermentable we see that it is their close relationship to d-glucose. It is only

necessary to exchange an H-O and an H-group in order to transform d-galactose and d-mannose into d-glucose. In a similar way it can be shown also for other ferments that the fermentability of a substance depends upon its chemical configuration.

III.

But this knowledge does not offer us much assistance in deciding the question whether it is a vital process of the yeast cell which makes fermentation possible, or whether the ferment of the yeast can exist independently of the life of the cell. Thirty years ago there was a lively controversy on this subject between Pasteur and Liebig. For Pasteur the process of fermentation was a phenomenon accompanying the life phenomenon of yeast. "Fermentation begins and ends with the life of yeast. Alcoholic fermentation never takes place without simultaneous organisation, development, and reproduction, i. e., without continuance of life." Liebig, however, attacked this vitalistic conception of Pasteur. To him life phenomena were only phenomena of motion and he did not accept Pasteur's explanation when he said that fermentation was a physiological process. Liebig himself considered that an explanation of the process of fermentation was only possible by means of physics and chemistry. Liebig compared the effect produced by the ferment to that produced by heat upon organic molecules. In both cases the motion affects the internal arrangement of molecules. He mentioned that acetic acid is split up into carbonic acid and aceton by heat, similarly as sugar is split up by yeast into carbon dioxide and alcohol. But there was still another and stronger argument in favor of Liebig's view. It had been shown previously that certain ferments originally contained in living cells can be separated from the living cell and yet continue to produce the same fermentative effects. For instance, living yeast is able to decompose salicine into saligenine and an acid, yet it was shown that a soluble substance emulsine is able to produce the same fermentation. Liebig argues from this as follows: "If we ascribe the decomposition of salicine by yeast to a physiological process, namely, the growth and development of the yeast, as Pas-

teur has done, we are not able to explain the effect of the emulsine. In addition, both the yeast and the emulsine have one peculiarity in common. If heated in water to the boiling point of the latter, they lose their fermentative power. Hence it is more probable that the yeast cell and emulsine owe their fermentative effect upon salicine to the same chemical compounds or conditions." . . . "We can imagine that the physiological process bears no other relation to the process of fermentation than to produce that substance which brings about the falling apart of the sugar and other organic compounds. Thus the physiological process would be necessary to produce this substance (ferment), but otherwise the life phenomena of the yeast would have no connexion with the process of fermentation."

Pasteur could not deny that the case of emulsine was contradictory to his vitalistic conception of fermentation. Neither could he deny it in the case of invertine, a soluble substance which can be extracted from the yeast with water and which afterwards continues to produce certain fermentative effects. But he saved his vitalistic views by adopting a discrimination proposed by Dumas, namely that there are two kinds of ferments: (*a*) soluble ferments like invertine, emulsine and diastase, which were called enzymes, and (*b*) living ferments that reproduce themselves like the yeast cell. The alcoholic fermentation of sugar was, according to the opinion of Pasteur, a process that could only be accomplished by the living yeast cell and hence differed fundamentally from the case of soluble ferments or enzymes.

IV.

During the following thirty years most authors accepted Pasteur's idea. The wonderful results of his bacteriological researches made the critics blind in regard to the weakness of his theory of fermentation. Only a few authors like Hoppe-Seyler stuck to the firm logic of Liebig. "The effect of a ferment on other substances," says Hoppe-Seyler, "only depends upon its chemical structure. If one says a ferment is an organism this statement cannot well have any other meaning except that we do not wish to discriminate be-

tween the whole organism and its constituents. The notion of an organised ferment that Pasteur and his followers applied to yeast can be applied with the same right to any living being and even to man."

Recently the controversy between Liebig and Pasteur has been decided in favor of Liebig. First of all, Emil Fischer tried to answer the question whether from a chemical point of view there was such a fundamental difference between organised ferments and soluble enzymes as Pasteur had assumed. We have seen that, in regard to the organised ferments, the stereochemical configuration of the molecule decides its fermentability. Fischer showed that exactly the same is true for enzymes like invertine and emulsine. He subjected two stereoisomeric compounds, α-methylglucoside and β-methylglucoside, to the effect of both enzymes. He found that invertine is able to split α-methylglucoside into methylalcohol and grape sugar, while it has no influence upon β-methylglucoside. Emulsine, however, splits β-methylglucoside into methylalcohol and grape sugar while it has no influence upon α-methylglucoside. Thus it was proved that in chemical regard there is no principal difference between ferment and enzyme.

In connexion with these researches Fischer intimated how it can happen that a ferment breaks up one compound while it cannot affect its stereoisomeric compound. Suppose the case of invertine which is able to ferment α-methylglucoside while it cannot affect β-methylglucoside. Both glucosides have dissymmetrical molecules. Fischer assumes that the enzymes too have a dissymmetry in their molecular configuration. "Their limited effect upon glucosides therefore might be explained by the assumption that the molecules can approach each other as closely as is required to bring about the chemical process only in the case of geometrically similar configuration. Metaphorically one can say that enzyme and glucoside must fit like lock and key in order to have a chemical effect upon each other.

The fact that the activity of enzymes is limited to such a high degree by the molecular geometry might be of some use for physiological research. But still more important seems to me the proof

that the discrimination, heretofore accepted, between the chemical activity of the living cell and the activity of purely chemical compounds does not exist as far as molecular dissymmetry is concerned. By means of this proof the analogy between living and not-living ferments which Berzelius and Liebig emphasised so often is re-established in an essential point. (Fischer).

But the opponents of Liebig still could claim that the alcoholic fermentation of grape sugar could only be accomplished by living yeast and that no adherent of Liebig had succeeded in extracting an enzyme from the living cell which could bring about the alcoholic fermentation of sugar. Until this could be done Pasteur's view was justifiable, namely, that the alcoholic fermentation of sugar is a life phenomenon of the yeast and that there is a fundamental difference between living ferments and enzymes.

Very recently, however, this objection too has been done away with. Buchner has succeeded in extracting an enzyme from the yeast which transforms sugar into alcohol and carbonic acid. He has thus brought about this kind of fermentation without living yeast. Hence the correctness of Liebig's theory was entirely confirmed. The reason which prevented the isolation of the enzyme of alcoholic fermentation from the yeast so much longer than the isolation of the invertine was a purely technical one. It requires a high pressure in order to separate the enzyme of alcoholic fermentation from the yeast.

Thus it is proved that the means which the living body possesses of transforming dead matter into living matter are enzymes which can exist independently and outside of living matter.

V.

The decomposition of large molecules into smaller building stones by enzymes is only one act of assimilation. The second act is the building up of new and different molecules from these building stones. The old belief was that such a synthesis was only possible in plant cells, but this is wrong. We know of a series of synthetical processes in animal cells, for instance the formation of hippuric acid from benzoic acid and glycocoll in the cells of the

kidney. While fermentations can take place without oxygen, oxygen is absolutely necessary for this synthesis. Synthetical processes are just as general and essential for the life of animals as for the life of plants.

That the synthetical side of assimilation depends upon the fermentative side of it can be proved directly. In our body carbohydrates are stored in the form of animal starch. The molecule of glycogen is much larger than that of sugar and evidently originates through a process of condensation from the latter. Voit was the first to assume and Cremer has proved that only such sugars are good builders of glycogen which are easily fermentable with yeast. The yeast cells resemble the human cells in that they are able to store their carbohydrates in the form of glycogen and not in the form of starch as the green plant cells do. This discovery was made by Errera. Hence our cells as well as those of the yeast are able to form products of condensation only from those sugars whose configuration makes them an easy prey to the enzymes of the yeast cell or of our body.

At present we have no data concerning the molecular configuration and the fermentation of proteid molecules but there is no reason to assume that the principles which hold good for the assimilation of the carbohydrates should not hold good for the assimilation of proteid molecules. All the facts which at present allow us to draw a conclusion upon the assimilation of the proteids point out that both groups of bodies behave similarly as far as assimilation is concerned.

In the process of assimilation the geometrical configuration of the molecules may play still another rôle. It might be possible that the form of the molecules present in the living matter predetermines the form of the molecule into which the smaller building stones are put together in the synthetical phase of assimilation.

VI.

From what we have said it is clear that the first step toward the artificial production of matter which is able to assimilate depends upon our further knowledge of the nature of enzymes. This knowl-

edge must be preceded by an understanding of the configuration of the proteid molecules. It is certain that the analysis of the enzymes is a problem which belongs to the realm of pure or physical chemistry. There is no reason to doubt that as soon as an analysis of the enzymes has been accomplished their synthesis will be accomplished too. Of course we are not yet able to judge how great the technical difficulties will be.

But the data which already exist suffice to allow the understanding of one essential point in the problem of heredity, namely how it happens that from the germ of an animal only an animal of the same species and of no other species can develop. The cause for this is that the germ of each species is only able to produce synthetically the typical compounds characteristic of this species. But as the assimilation through the germ of an animal is determined by the nature of the enzymes it contains, we must form the conclusion that the egg or the sexual cells are in so far bearers of heredity as they are the bearers or producers of specific enzymes which are characteristic for each species.

The problem of assimilation is at the same time the fundamental problem of heredity. Any theory of heredity must be based upon the mechanics of assimilation. We therefore have to substitute for or add to our purely morphological hypotheses of heredity a chemical theory. We do not need to be surprised at this. Living organisms are in the first place chemical machines and the process of embryonic development is determined by a definite series of chemical changes. It can be shown indeed that for the heredity of instincts as well as that of forms we do not need to assume anything more complicated in the sexual cells than the presence of specific chemical compounds especially enzymes or zymogens.[1] They are the true bearers of heredity.

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[1] Cf. the article "On Egg Structure and the Heredity Instincts." *The Monist.* July, 1897

THE SOCIAL PROBLEM.[1]

THE PROGRAMME which we sketched for resolving the questions propounded in *The Monist* for October 1893, and which were summarised again at the conclusion of the article in *The Monist* for October, 1897, was evidently too vast. We are desirous of hastening to our conclusion. Yet much remains to be examined. The studies leading to the practical goal set by sociology are in reality divided into three parts: (1) The foundation, the preface, so to speak, which is absolutely necessary, and which reposes upon anthropology. We are here concerned with the science of man and of his relations to nature, with the motives of his acts, with his strength and with his weakness. Man is an animal. His animality is the source of all the difficulties in society. It is the enemy which must be combated and which consequently must be exhaustively studied. (2) Sociology proper, which is the history: (*a*) of animal societies; and (*b*) of human societies, of their development, and of the varied and complicated phenomena which they present from their origin to the present day. (3) Social science, the chapter to which we are now come, and which, in its highest domains especially, is the application of the truths discovered in the preceding parts, to the needs of modern societies.

The apparent or real contradiction between nature, the individual, and society, between the social evolution such as it actually is and the social evolution such as we should like it to be, between the ends of nature and the ends of society,—such is the main problem which we are called on to elucidate. The misunderstand-

[1] Translated from Professor Topinard's MS. by T. J. McCormack.

ings which obtrude themselves into the solution of the questions here set, arise wholly from the confounding of the following three points of view,—nature, the individual, and society. Thinkers start in their reasonings from nature and draw conclusions as to the individual: or, they begin with the individual and draw their conclusions as to society; or *vice versa*. The prime requisite is clearly to separate these three points of view,—which we shall now endeavor to do at the risk of slight repetitions, perhaps.

NATURE.

The universe is summed up for man in two words: the ego and the non-ego; the centre and the circumference. The ego knows the non-ego by the images it receives from it; it observes their differences and resemblances, fixes and classifies their relations, and gradually rises from particular considerations to more general views. These relations, these views, are ideas, which may be distinguished into positive and negative, particular and general. Among general negative ideas are the concepts of infinity, of nullity, of a beginning from nothing, of an end leaving nothing. Among general positive ideas are the concepts of succession or of time, as in the cinometograph; the concepts of parallelism or space, arising from the impossibility of conceiving two things to occupy the same place at the same moment; the concepts of continuity and intermission, of causality or independence, etc. Ideas may be further distinguished into relatively direct and relatively indirect ideas. The latter are the product of induction or of imagination. The ideas of absolute welfare, of absolute good, of absolute beauty, are comprised in the last category. They are concatenate ideas, conceived at their maximum of expression in a type which the mind represents to itself. Absolute good, welfare, and beauty are not realities, but the conception of an ideal, of a *ne plus ultra*, along a certain path. The union of the three is absolute perfection, perfect harmony in the whole, a complete adaptation of things to one another, the reaching of the objective goal conceived by the subjective mind, of the non-ego by the ego.

The last utterance of positive and inductive knowledge, as

given by the present state of science, may be summed up as follows. Matter and energy are always associated, and, under infinitely varied forms, are eternal. These forms are in a perpetual state of mutation. Rest is but a transitory appearance; change is the life of the universe. Matter composes all bodies,—solid, liquid, gaseous, or what not; energy engenders all phenomena. The commonest form of energy is attraction, which by two different processes gives rise either to motion or to molecular cohesion. In new aggregations adaptation to existing things is the first law. The formations or mutations are effected in all directions according to the solicitations and resistances; but judging from the portion of the universe of which we form part, and in its existing phase, one general direction predominates in them,—a direction from the simple to the complex, from the similar or non-differentiated to the dissimilar or differentiated, from the unstable or non-adapted to the stable or adapted. This general direction in time and space is what is called evolution.

Evolution, although single in your eyes, is yet, for purposes of study, divided into as many particular evolutions as there are separate subjects to be considered. Such is the evolution of our solar system, of which our planet is but a fragment, the evolution of life on the surface of our planet, the evolution of the ego and of thought in the animal series, the evolution of human societies. The beginning and the end are the critical problems of the two first. How, in the initial star-dust, were the first combinations of the mobile atoms, which were originally alike and independent, effected? And how through them was the first centre of general attraction created? How on our planet was the first granule of protoplasm formed? The end, so far as we are concerned, we know. Our earth will cease to be habitable. It will grow cold again, will doubtless lose its atmosphere, its humidity, and will resemble our present moon. Evolution, from having been progressive, will become stationary, then regressive. Some day, as Huxley has asserted, the lichens, the diatomes, the Protococcus, will be the only living beings adapted to the conditions of life, and finally there will be nothing. As for our sun, when it shall have exhausted its present store of fuel, when

it shall have become inhabitable and shall have had its ascending and descending evolutions, and possibly also its human phase, it too in its turn will become a dead star lost in space, and other systems will begin and will shine for a period, to end as the others have ended. And to what purpose is it all? Our imagination, our reason, can they conceive of anything which does not remove, postpone the difficulty without solving it? One need but read pages 446–448 of the French edition of Guyau's *Irreligion of the Future* to learn what even the most seductive conceptions lose when we seek to support them by speculations regarding the inaccessible in the present state of science. The wisest course is to confess humbly our inadequacy and to take refuge in the agnosticism of Huxley.

The factors of organic evolution on the surface of our planet, as we have already stated in *The Monist* of October, 1895, page 46, are as follows: (1) the spontaneous expansion of life, or the augmentation of the matter which is its seat at the expense of other matter received from without and assimilated, up to the point where the separation of a part of the mass is effected,—by which act results the creation of other individuals; (2) the spontaneous variation of individuals so created,—the first cause of the differentiations and multiplications of living forms; (3) the adaptation and increase of those of these variations which are utilised and suit with the conditions of existence,—the second cause of differentiations and particularly of their establishment. Heredity, or resemblance by continuity of individuals, and the survival of the forms best adapted to the circumstances, are but consequences. The expansion of life is effected in all directions, where no resistance is made. A fragment of *Lemna* thrown upon the surface of a pond sends forth its branches on all sides and ends by invading the whole pool. Variations likewise are effected in all directions. The utilisation and adaptation of these variations alone determine the directions which the forms take under the influence of circumstances, such as accident gives rise to, marshals and renders efficacious. At times these circumstances come into conflict with one another, at times they confirm one another. They accelerate, retard, or arrest progress in the path followed, up to the point where they change it, turn it

aside, pull it backwards, or cause it to describe a zigzag course. They give birth to types which are marvellously successful, but more frequently perhaps to imperfect, faulty, aberrant, partly non-viable, types which respond to the need of a day but not to the general needs. Such, for example, to cite only mammals, is the type of the sloth, condemned by his unfortunate organisation to a passive existence, from which he cannot wrest himself; the type of the great animals which became extinct in the Jurassic epoch; and even the type of our elephant of to-day, which requires such great quantities of nourishment that it is surprising that it is still existent. There are admirable linear series such as that of the Primates, where advance follows in harmony with reason, and which sooner or later must give good results. But there are also series which have been hoodwinked, so to speak, which have been thrown off the track,—series which can never lead to anything, which have ended in a *cul de sac*. Thus the high-road of evolution is strewn with victims, with imperfect beginnings, with species incapable of persisting, with misfits. Still, since in this hecatomb the fit survive, and the unfit succumb, the general result, in the present state of things, is what is called progress.

In sum, the evolution of life upon our planet is neither an entity, a cause, nor a force, but a series of effects, the result of an incessant struggle between the expansion of life and the conditions which confront it. Life expands blindly, capriciously, without plan or design, as circumstances shape its course. In this evolution two things are to be distinguished: a general direction towards improvement in the general conditions which we now know; and possible particular directions, having greater or less duration. The latter are good or bad according to the particular species concerned, and it may even involve advantage for a given species to resist the natural evolution and when possible even to direct its course.

We have seen, in fact, that the various species at the various epochs in which we have considered them,—the Jurassic, the Eocene, the Pliocene, and the present,—are comparable to the terminal efflorescences of a tree of which the dead branches and trunk have disappeared; and that through subsequent flowering these

efflorescences are replaced by others; that, in a word, the common law of all species, both good and bad, is death. Among the mammals, very few species have perpetuated themselves through several ages. Does not the conclusion suggest itself that if some one of them by some exception possesses some peculiar quality which enables it to shape in some measure its destiny, and to secure for itself in some measure its own happiness, it is reasonable that it should make full use of that quality. It is a positive fact that Nature has no concern for the numerous species to which she has given birth, no more than the tree has for the leaves which turn yellow and sear every autumn, and fall to the ground. Nature, like evolution which is but the result of its mutations, is not a personality. It has neither feeling nor reason; it has neither the notion of the good nor of the beautiful. Whether a species is good or bad, whether it is adapted or not to its environment, whether ten, twenty, or one hundred die before a good one is reached is a matter of indifference to her. Nature is a state of things merely, a series of changes, a wheel which turns perpetually, a world inhabited or uninhabited which rolls through space. If man is more favored than other species he has to thank himself alone for it. He may erect altars to Nature and invoke her aid, but she will abate not one jot or tittle of her onward movement. If he would escape the common fate, if he would ameliorate his condition, be happy, let him make her his servant, reign over her so far as he can; but let him place his trust in no one but himself.

THE INDIVIDUAL.

The species is merely a definite number of individuals, which have sprung one from another, which have been separated since their birth, and are independent. Among the vertebrates some forget their parents, others abandon them as soon as they can, and preserve no remembrance of them. The individual, in fine, is the real and tangible thing, the only thing in living nature which joins psychical attributes to physical attributes, the only thing which, while subject to the laws of nature, bears within itself some spontaneity of its own, if not a relative autonomy; the thing in which all

life, all organic evolution is materialised, and which is at once the beginning, the middle, and the end; the thing which is born, which grows, dies, and propagates itself, leaving behind it new individuals, always distinct and independent. It is the individual which varies, works, and is transformed by insensible degrees, donning the infinite forms which people our planet and which the naturalists divide into species, families, orders, etc. Alone of all the bodies of the universe it knows the objects which surround it and concern it, the movements it executes, and is cognisant that it exists; it alone rises in the front of and in defiance of Nature and reversing positions makes itself its centre; it alone in a certain epoch of its development possesses a centralised ego which thinks and reasons.

Upon this characteristic ego, depend, directly or indirectly, all the acts of the individual which lay a claim to our attention. It is doubtful, as we have shown, whether it exists among the Protista. There are as many particular egos among the lower composite animals as there are parts in connexion with its special division of labor. Among animals not so low in the scale, certain of these egos become confluent, and one of these confluences attains supremacy. Among the vertebrates they are centralised in a special organ.

The central ego does not intervene in all circumstances, but only after an intermittent and facultative fashion. It abandons to the spinal chord the ordinary acts, which the organism has contracted as habits, and enters into play occasionally only, to modify those acts according to the special requirements of the needs of the individual of which it has the administration. In the reptile, the vulture, the marmot, these needs are limited to eating, drinking, sleeping, keeping warm, satisfying the instincts of reproduction, avoiding danger, and acting in self-defence. Their foresight is minimal, frequently zero; the individual thinks of the present, at most of the morrow, or of the winter to follow. Memory is limited, reflexion is directed only to the immediate effects of acts; habits or instincts predominate over everything; the ego intervenes but little. In some of the higher mammals, as the elephant, the monkey, the domestic cat, the picture begins to change. The faculty of ob-

servation, memory, reflexion, foresight, increase; the rôle of the ego becomes more pronounced; it interferes more.

In man, especially in our days, the picture is totally different. His needs have infinitely increased, the necessaries of life no longer suffice him, he reaches out for the superfluous, for the comforts of life, and for the pleasures of the intellect. He has ungovernable desires, passions of all kinds; he pursues various ideals. The motives of his resolves are numerous; he has many various ways of yielding to them; he carefully foresees the effects of his conduct. His ego has unceasing opportunities for intervening, for deliberating, and for taking the initiative. Its task is so great even that it would be unequal to it, did not its powerful memory enable it to store up the results of its former deliberations, did it not suppress part of the reasonings through which it has passed, did it not progressively simplify its procedures, did it not establish in itself habits of feeling, thinking, and reacting which greatly diminish its labor. Let us dwell upon this capital point.

The exterior acts of man are of two kinds: the one voluntary and attended by the premeditated and deliberate intervention of the ego; the other more or less unconscious and unattended by that intervention. The latter acts are the results of habits contracted by the individual himself, or bequeathed to him by his ancestors in the form of predispositions more or less susceptible of inducing the same habits under the influence of the right kind of excitations. The ancestral habits, confirmed and consolidated by their repetition from generation to generation, are instincts or instinctive acts. The individual habits, sometimes just as powerful, are of the same character, have the same mechanism, and deserve on the same ground to be called instinctive acts. The following are examples: swimming, following mechanically a path which is daily pursued, drawing one's sword and placing oneself on guard in the presence of an enemy, jumping into the water, without reflecting, to save a fellow-being, copying a page of handwriting while thinking of something else, speaking without knowing what one is saying, etc.

Instinctive acts when totally unconscious have their seat in the spinal chord. A peripheral excitation reaches that organ and is

there transformed into a co-ordinate, reflex movement, the movement which the excitation in question habitually engenders. The excitation extends also to the brain, but that organ is indifferent to it, does not focus its attention upon it, and suffers the movement to be accomplished without its intervention. Nevertheless, the excitation may be perceived, may awaken in the brain analogous anterior sensations which have been stored there, corresponding ideas and motor reactions which are habitually disengaged without the ego's interference or opposition. This is what I call a cerebral reflex act, whereas the preceding case was a medullary reflex act. It goes without saying that the habits contracted, whether ancestral or individual dominate the whole phenomenon. The nervous circuit having been traversed, the response given will conform to the habitual mode of feeling, thinking, and acting, as influenced by said excitation. The ego assists more or less consciously but performs no act of will, or at least executes but a very secondary and feeble sort of volition. Such is the case of the soldier who, transported by his courage, rushes into the face of the most certain danger, or that of a friend into whose arms, yielding to your first impulse, you throw yourself, although he has betrayed you and done you injury. Such are the impulses more or less unconscious, which impel us to commit acts which are frequently in perfect disaccord with our interests, although in accordance it may be with what Kant calls the categorical imperative.

The really voluntary acts are those in which the excitation is the object of serious attention, in which the response is deliberate, its immediate and remote results carefully weighed, the various motives *pro* and *con* collated and compared. Nevertheless, there is constantly heavy pressure brought to bear upon the will, from which the ego has great difficulty in extricating itself. The varying forms of sensibility and faculties which intervene in every intellectual operation are what heredity and personal education have made them. At first the ego perceives, judges, and acts impulsively along the lines in which its ancestral substance swings it. Then it is influenced by the modifications which it has experienced during its life and notably during its infancy, the time when its brain was growing

and absorbed readily everything that was offered to it. It has been moulded by its family, by its first comrades, by its first impressions, by the results of its first acts, by the examples which have been set it, the events of its age, by the success or non-success of its conflicts with society. It believes in what has been taught it and in what it has reached itself by its own observations and meditations. A mode of thought is formed, favorite ideas are acquired of which it is never the master and which control it. It has a lively or obtuse sensibility for some things, and none at all for others. It has an optimistic or pessimistic temperament, it is idealistic or free-thinking. Besides, the ego is subject to general or accidental dispositions, both of brain and of body. A sound brain in a sound body is the first condition of liberty, just as sufficient preparation for the subject under deliberation is the first condition of good judgment. The volitions of the ego are thus a very complicated resultant of numerous and variable circumstances, both internal and external. The ego does not estimate things by the same standard in its tenth, twentieth, thirtieth, and sixtieth year, in the spring and in the autumn, in the evening and in the morning. Nor is its judgment the same with a peasant whose horizon is limited and with the metropolitan whose views are broad, with the proletarian who has suffered and with the rich man who is saturated with indulgence, with the ignorant, the man of letters, and the scholar.

Yet there is one thing that is common to all men,—an ego entrusted with judging what is good, useful, and agreeable for the individual, with making its decisions conformably to its interest, with foreseeing the harmful or advantageous effects of its acts,—in a word, with presiding over the conservation and prosperity of particular individual of which it has the charge. Medullary and cerebral habits enable the ego to restrict its activity in the generality of exterior acts to a mere Platonic surveillance. But as soon as new circumstances throw the least doubt upon the utilitarian character of the habits, its duty is marked out for it, it is bound to intervene, to throw aside all sentimentality, to array itself in the armor of reason, to appeal to its entire experience, to summon all the

light at its command, and to render its decisions in the fullest plenitude of its independence for the best interests of its client.

From these considerations it follows that, setting aside reflex acts which are purely medullary and holding only to acts which are cerebral in their origin and to their species of determinism, three types of ego may be distinguished. The first, which is *par excellence* physiological and which goes back to the very origin of the species, is possessed by man in common with all animals; it has charge of the defence of the individual, and can be inspired for no object but its best welfare. The second is the result of habits acquired by ancestors and transmitted to the individual. The third is the product, in the individual himself, of the circumstances in which he lives, of education, of private habits accidentally or forcibly acquired, of surrounding passions, etc. These two last egos, which are more or less automatic, may be comprised under a single designation, which we shall give later. The first is the animal ego, but active and reasoning; on this we shall dwell exclusively now, reverting later to the two others.

Let us put ourselves in the point of view of the individual who possesses it. "I have a limited time to live upon this planet," he will say to himself; "of the beyond I am ignorant, or rather I know it only too well; the thing is to steer my bark as skilfully as I can and to be happy; not to suffer myself to become a prey to illusions or to be over-powered by sentiment when no profit can be expected from it; not to accept as the truth what reason has demonstrated to be false; to see things as they are; in a word, never to commit, from routine and naïveté, acts whose outcome will not correspond with my intentions. My body, my health, my physical and psychical satisfactions, the sufferings that are to be avoided—such are the things I have to consider. The non-ego has value only through and because of the good which it can bestow upon me, because of the profit which I draw from it, of the happiness which it procures for me. I have had experience with men; I know that if some are good the majority are selfish, are not prone to give something for nothing, and have a solicitude for me only in so far as they believe I can be of service to them. The first thing is to wrest from the

world my independence, not to have need of any one, and to create for myself a safe and enviable position. The esteem in which people shall hold me, the number of my friends, my credit, my power, will be proportional to that independence and that position. The less that I have need of others, and the more that they have need of me, the more will I be sought after. What I love most of all in the world I must confess is myself. Next come my wife and my children. I love them, protect them, because they belong to me, because they do me honor, and because they render back to me the affection which I render them, and because they will have to take care of me in their turn when I have grown sick or aged. So true is this, that if they do not give me the satisfaction which I expect from them, that if they cause me more sorrow than happiness, I shall stifle my sentiments, cast them aside, arrange my life differently, and disinherit them. I love my neighbor because I am rewarded in some way by him; he listens to me, he comprehends me, his conversation is agreeable to me, he is indulgent to me. I am willing even to make certain sacrifices for him on condition that I do not run too great a risk myself. I love the country and society in which I have been born, because they procure for me numerous advantages, although I am quite capable of infringing its laws when they annoy me and when their non-observance will bring on me no inconvenience or penalty. I shall be honest for numerous motives, one of them being because I wish others to be honest with me. I shall be charitable if I am rewarded for it by public opinion and if my sacrifice does not exceed the pleasure I can derive from it. I shall profess the most exalted and most generous principles: stoicism, justice, liberty, solidarity, equality for all; first, because I myself am included among the "all"; then because this may just happen to be my favorite idea or a useful thesis; in a word, I shall make it a point to have incarnate in myself all these virtues for the reason that they are to my best interest. As to going to the bottom of my conscience, as to analysing my motives in all cases, that is all very well but it is useless. I prefer to have a high opinion of myself and to be convinced that I am good and disinterested.

Of what use would it be to confess to myself a truth which would lower me to the level of the animal."

The picture is a gloomy one but it is only too true. Egoism is the essence of the animal ego which we are describing; altruism itself is but egoism disguised (see *The Monist*, July, 1896, p. 552). When the two confront each other, when the other types of ego of which we shall speak are silent, and when the cerebral balance is exact, brute egoism will always carry the day. Suppose two individuals upon the ocean in a vessel. No hope, not a sail on the horizon, with enough to eat for one only; they are dying; the two egos face each other, both eager to live; the one will slay the other. From this extreme case to the lowest case of simple distinction of good and evil, all the intermediary stages are met with. And yet the animal ego is neither good nor bad in the nature of things. If it were not for the difficulty of obtaining a livelihood, for the competition and strife which results therefrom, its sensibility would carry the day, and it would be nothing less than kind. In reality, by virtue of his reason man is utilitarian. The more intelligent and enlightened he is, and the more rigorously he adapts his acts to the objective reality of things, the more "practical" will he be, as it is called in the language of the day.

SOCIETY.

Society differs from the individual, as much as the individual does from nature, but in a different direction. The following is the order of gradation: the universe which is the totality of the stellar systems including our own; organised nature which we know of only on our planet; the human individual which is the highest form of organised nature; society which is a mode of life that new conditions have rendered obligatory for the individual. Man has domesticated animals, has invented flint instruments, navigation, agriculture, exchange. Pressed by the same necessity, he has invented society, that is to say, adaptation to his needs for companionship, which hitherto were less urgent, and he has gradually made of it a sort of permanent personality, taking the place of the real but transitory personalities. The following is its evolution.

Among animals the assemblages were at first indifferent, as we have seen, and were formed by imitation among individuals having no motive for hostility. Habit resulted, then a sort of pleasure, finally reciprocal altruism. The individuals constituting the group lived under the same roof for warmth, they formed serried bodies for resisting attacks, they hunted in concert, and assisted one another variously. The weak sought out the strong, the strong protected the weak and naturally became the chiefs. The highest stage reached is represented by the instance of strategy among monkeys which we narrated after Romanes, and by the cases where sentinels have been punished for neglect of duty, or where judgment has been passed by a sort of tribunal.

In man the same two phases recur. The first is spontaneous or altruistic; the second reflective and based upon interest. A special reason is added in the first phase: with man the young remain longer with their parents and continue willingly with the family, which by favoring the maintenance of altruistic sentiments becomes the nucleus of a subsequent society. But man, owing to his intelligence, cannot in the second phase help discerning more and more the advantages resulting from life in common and is forced to go further. Thus defence against enemies with him rapidly takes on a special physiognomy; collective defence becomes collective attack; the passions, the love of domination and glory, mingle with the rest, and the curse of militarism spreads on all hands. Yet within, every one still remains for a long time the master of his acts, and shapes as he pleases his relations to his fellow-men. Customs become established of themselves for each case. But the day arrives when the differences threaten to spread and to compromise the security of all. The general interest requires intervention. Then arbitration is invented, compensation for all kinds of crimes, punishments, prohibitions, etc. Customs become rules, and then laws, the great number of which grows as the population and the complexity of the mutual relations grow.

But in these societies, subsequently to the naïve and patriarchal phase of the fathers and the elders, came a second period, where the more adroit and the more ambitious assumed the task of

controlling the general interests, while the others kept to their ordinary occupations. Thenceforth free reign was given to individualism, which is inseparable from human nature. In the hands of the conductors and administrators the general interest was subordinated to particular interests, society became their special property, and was mismanaged to their profit. Hand in hand with this, as a result of the division of labor and of the transmission of the consequences of the struggle of each for existence, society was divided into groups, for the most part professional, in which individuals, from father to son, became immobilised,—one class reputed noble and filling the highest offices of society, the warriors, the priests, the magistrates; the other reputed inferior, if not servile, the farmers, the merchants, and the laborers. Other groups were added; the strangers, who were admitted into the social group without sharing its advantages, and the conquered who were made slaves. Thus social classes became established,—the negation of the principle of equality of the advantages to be derived from a social state, which from the beginning was necessarily the tacit condition of every system of life in common. The internal social evil which resulted therefrom, and the external evil, the militarism which we have opposed to it, have thus totally falsified society. The initial object was the happiness of all, and greater facility in subserving their needs, each entirely responsible for his acts but enjoying the fullest play for his faculties and the external means for investing them with equal value for all. This result was obtained only for a part of society, the least part, the strong and the intelligent. The others, that is to say, the immense majority, not only gained nothing, but were placed in a condition inferior to that in which they existed in the state of nature. Society is but a hierarchic scale: at one extremity are the privileged by birth, entering into full and immediate possession of all the honors, of all the enjoyments, without having done anything to gain them. At the other extremity are the pariahs who inherit nothing but the misery and the sufferings of their ancestors, and lack the possession of the meagrest arms for struggling, predestined to defeat before having

engaged in the struggle, condemned, they and their children, to the hardest possible fate, often without hope of termination.

At its origin society looked to nothing but the present. When the enemy attacked, all seized arms; and when the combat was done, they returned to their customary occupations. But little by little the levying of the population *en masse*, the successes collectively gained, the treaties concluded for long periods of time, the necessity of extending territory which had grown insufficient for the population, gave rise to a vague sentiment of solidarity of interests, which extended beyond the present moment. The rules adopted for the relations existing between individuals were in themselves an indication of foresight, being as much concerned with children born and to be born as with the present existing generation. The council was a permanent institution, of which new members were chosen when vacancies occurred by death; sometimes the office of chief was hereditary. A tradition was thus constituted. The memory of the past, ancestors held in universal veneration, household gods, the annual ceremonies invoking these objects of worship, solidified the bond. The collective qualities of a tribe, its reputation, its prosperity, all its belongings, formed a patrimony which all took pride in transmitting intact and when possible augmented. Every society which had achieved something became thus a state,—a corporation possessing a genuine capital at once physical, intellectual, and moral, which was increased from generation to generation by many successive acquisitions,—a continuous fictitious personality exerting its authority over real personalities and having no compunctions against sacrificing them to its interests. Such were the ancient municipalities where defence and attack formed the pivotal interests. Such are our modern nationalities,—a guardianship which is not infrequently irksome; a mechanism of the most complex kind; a scientific concentration of all powers.

The strangest thing is that these personalities in their relations with other societies have taken on the habits, adopted the modes of thought and action of a real individual, and that like the latter they seem to be in possession of two egos: one reflecting the tradi-

tion and distinctive character of the nation (altruistic, let us say); the other sociocentric, egoistic, and given absolutely to its own interests,—with this difference, that in diplomatic science the first-mentioned ego is looked upon in the light of a weakness and a sacrifice of self, whilst the second becomes a force, a proof of capacity, a superiority. In international affairs nations who are actuated by sentiment, who base their conduct upon principles and appeal to maxims of duty and humanity, are called chivalrous, whilst those who pursue the policy of results only, and who keep steadily in view their interests, are regarded as utilitarian. If any additional argument were needed for demonstrating that individualism is a synonym for interest and egoism, our powerful modern civilisations would furnish it. Cleverness is the means, our great battalions the sanction. Public opinion is shrewdly respected, because the press supports it, and because at certain crises there is need of it, to say nothing of the occasions when credit is necessary. To divide in order to rule, to reach one's ends even by underground practices provided appearances are preserved, to bend before the strong, to abuse the weak, whether savage or civilised, to succeed without arousing coalitions, such is the international ethics of to-day, as it was in the time of the Prince of Machiavelli. What is there more odious than the so-called "reason of state" (necessary withal), which authorises everything, and which at the moment that I am writing in France causes the same act to be designated on one side of the frontier as patriotism and devotion to country, and on the other as rank infamy. What can be more lamentable than societies all in arms, ready to throw themselves at each other's throats and to sacrifice thousands and thousands of individuals who are not responsible for the causes of the wars waged. If the animal nature is always present in the individual, it is much more so, though under more polite and refined forms, in international politics.

Yet let us not fail to observe that there has been progress. Treaties are no longer broken with the same facility; they have been invested with more form; the favorable moment is awaited. Contracts, comparable to those of gamesters or of operators at the

stock exchange, are now generally kept with faith because answering to a common need. The ordinary conventions which concern international law, and general conventions, such as those which make certain countries, certain water-ways and isthmuses neutral, are constantly gaining ground; arbitration is becoming more common, and strenuous efforts are constantly made to avoid recourse to the *ultima ratio*. Some day there will doubtless be permanent international tribunals for settling disputes between societies, the same as there are now for adjusting differences between individuals; but that day is still remote. A society forming part of a vast federation of this kind will always preserve toward the federal union the same attitude that the individual within it now maintains towards society. Society has its sanction in the punishments which it inflicts. Will the federation of societies we speak of in the future be capable of resorting to the same expedient?

This progressive transformation of a simple and naïve society, given to seeking the best mode of life in new conditions, to extending mutual aid and to realising general happiness, into a complex social stock company, giving good dividends from the high point of view which we shall speak of soon, but distributing its profits and its losses among its stockholders in a most unequal fashion, giving to the one class the favors and the facilities of existence, and to the other the burdens and all the irksome inferiority—is this the end and ideal to be reached? Man has outstripped the animal; he has marvellously developed the system of life in common. But as regards the real object to be gained, he has ended in bankruptcy. We have seen that evolution in living beings makes ultimately in the general direction of the adaptation of the best individuals forming a species to the external conditions in which they are called to live; but that before arriving there evolution strays off frequently into useless and regrettable paths. Such has been the case of man considered from his own subjective point of view. If the evolution of human societies is ever to attain the desired goal we must say that the day is still far distant and that the by-path into which empiricism has conducted it deserves the qualification of

deplorable, whatever passionate admirers of the *laissez-faire* theory may think of it.

But how has this unfortunate deviation been brought about? Why has empiricism, the servant of circumstances, ever led to such a result? It is because nature does not hold the same views as we do, or rather, because it holds none whatever, because it proceeds blindly with its fatal laws, and takes no heed of our opinions or of our desires. It is because the best for nature is not the best for us; it is because man, in order to attain what he desired, ought to have changed himself and transformed his animal nature. At the outset, society conformed to the individual, but this did not last long. The reaction of individuals, one upon another, grew stronger. Some struck and cut about them at pleasure, the necessary relations were falsified; everything was embroiled. Society became a thing apart, an assemblage of conditions which were quite different from what they were at the start, a milieu *sui generis*. But the evil was too deep-seated, the adaptation was not effected. Man has preserved his animal nature, which remains in conflict with his environment. Society and the individual have become antagonistic; what the one demands does not suit the purposes of the other. Social life is a composite of sacrifices often imposed without compensation and greatly exaggerated; the individual desires to be free and fully responsible for his acts. Man is an integral part of nature and is subject to its imperative laws; society is an edifice constructed upon the sand of conventional materials.

This leads us to speak of some of the principles upon which it reposes. These principles will complete our parallel of the three points of view: nature, the individual, and society. For the present we shall reduce them to four: liberty, and its counterpart solidarity; equality, and its corollary justice.

Liberty.

Liberty is a human conception involving volition. Liberty does not exist in nature where there is never spontaneity but only effects, determined by one or several causes acting in different directions and counteracted by others acting in contrary directions. The

strongest or the resultant carries the day. In plants and animals all phenomena are the consequence of organisation, actuated by exterior or interior agents. So-called acts of will are the results of excitations, which bring into play ancestral and personal habits and the moods of the moment, as we have termed them. The same is true of thought, save that here the excitation is sometimes internal and so bears the appearance of spontaneity. Psychical freedom is relative and depends on the ego. This being understood, the individual in the state of nature enjoys all the freedom his organisation allows. He is restricted in his acts only by material obstacles, his muscular and nervous strength, and his own judgment of his motives for acting in given cases. In the presence of one of his fellow-beings he behaves as in the presence of an animal whom he desires to conciliate or to combat. According as his relations with his fellow-beings grow more extensive, he learns to restrain himself, but only under pressure of force or for some analogous reason. In society he is subject to necessity which places upon his primitive instincts of liberty restrictions which he cannot escape.

To describe (1) the province in which the individual is permitted to move about with perfect liberty, and (2) that remaining province where such movement is forbidden; to describe that which is his and that which is others',—two words have arisen in modern society, *rights* and *duties*. Neither the one nor the other exists in the state of nature. There man does what he wants to and what he can. He has duties towards himself only, and they are of the physiological order. The inalienable rights of the French Revolution are rights that are considered indispensable to the existence of man, and of which he cannot be deprived. They answer to what Thiers has called "necessary liberties." Yet it is admitted that in case of war, or the suspension of social laws, they may be temporarily suppressed. Duties are the correlatives of rights, being the obligation to respect in others what we would have them respect in us. They are embodied in the laws and may be summed up in the phrase "obedience to the laws." They are absolute, and their infraction entails punishment. By their side there are other duties having no direct sanction, being prescribed by custom, pub-

lic opinion, self-respect, veneration for family and ancestors. It is needless in social practice to speak of rights. The individual is only too much disposed to broaden their conception. On the other hand, there is a constant necessity of speaking of duties, which are the momentous point and form the very essence of life in common.

Solidarity.

Solidarity is a physical, functional, or psychical bond between parts. It is extremely widespread in nature. Every body is an assemblage of molecules solidarised by cohesion. In a stone heat, humidity, shocks are propagated from one grain to another; if we separate a grain its solidarity ceases. In organised beings solidarity gives rise to colonies of merids, zoids, demes. In the first stage, cohesion pure and simple is the cause. Take the simplest aggregate of cells. Each cell has its own life and forms a distinct individual, but being joined to its neighbors it is solidarised with them to a certain extent. If one be separated, it continues to live but is independent. In the higher stages the solidarity becomes functional. Each part is specialised, is entrusted with some given function, which it performs to the profit of all the other parts of the colony, just as in its turn it profits from the functions which they perform. In the last stage when the solidarity is complete, all the functional individualities are merged into a single individuality. There is unity.

For the free individual in the midst of a vertebrate species, for example, the word is meaningless. There is neither cohesion, community, nor subordination of function here. Absolute independence is its characteristic. But a relative or psychical solidarity resulting from sympathies, needs, or common interests may be established. Exchange of service is the first stage. If the exchange is repeated and has grown habitual, if it is premeditated, if something is offered for the general use with a view to deriving profit from it, the solidarity is increased, within set limits. Such is the origin of commercial societies and of all professional associations. Society, so called, is the most advanced stage of solidarity. The sacrifices, the advantages, and the responsibilities are divided. Yet the solidarity

is even here not complete. Every individual has his reservations and will not suffer himself to be stript of all his freedom. The first distinction to be established here is that of a state of war or of peace. In the first case the solidarity is complete as regards all the means or needs of common defence. Every individual is under obligation to all the others without their being under obligation to him, as it is in animal colonies which have perfect solidarity. In the second case it remains psychical and general to the extent that when prosperity or misfortune befalls a whole or a part of the community, accidentally or through the administration of the latter, all bear the consequences of it, whether they be good or bad. Similarly, if a change be made in the laws, all either suffer or profit by it. It is this sort of solidarity that engenders the idea of country; it is none other than that of common interests. Solidarity is an *a posteriori* conception. It has been spontaneously and progressively produced as a consequence of life in common. It differs totally from the physical and physiological order of the animal colonies; it has no other sanction than the interest of the individual on the one hand and the law with its coercive measures on the other.

Equality.

Equality exists in nature, but fortuitously. Here the effect is always equal to the power expended, or to the sum of the powers diminished by the sum of the resistances. But, excepting the case where they counterbalance each other, the power and the resistance are so unequal and so varied that the effects are generally unequal. Two bodies have rarely the same dimension, the same form, the same properties exactly, two individuals the same value. The one will always get the upper hand of the other. Among species as among the individuals of a species, inequality is the rule and is moreover the condition *sine qua non* of evolution. In the most perfectly organised societies equality is merely coterminous with the laws which are common to all. As to the rest it is simply a word, a principle flowing from another principle,—namely, solidarity. But solidarity being purely psychical and restricted according to circumstances, and equality never being complete even in

perfect solidarities—such as those of absolutely unified animal colonies,—therefore equality can make no pretension to being absolute. The foundation of the principle is as follows. Men united in society make equal sacrifices or, more exactly speaking, sacrifices which are regarded as equal, and assume an equal share of the general responsibility. Therefore they must be equally treated and must enjoy equal advantages. But from theory to reality is a far cry. Equality is a magnanimous dream, the cliff on which all endeavors are shattered.

Justice.

There are few words whose signification has varied so much from antiquity to the present day, and so well reflects the customs of the time. In its highest stage it is a pure human conception, which in its most widely accepted meaning is equivalent simply to possessing or receiving what is one's due.

Let us see if there is anything in nature corresponding to this idea. A body rolls through space, enters our atmosphere, becomes incandescent by the friction, and bursts into fragments. A storm arises, the oak is torn out by its roots, the reed bends and straightens again. A wolf pursues a stag who flees, the one to eat, the other not to be eaten; both exert their powers to the utmost; the victorious wolf is recompensed for his perseverence, the stag succumbs through his insufficient powers of respiration. The Tasmanians live happily; the whites invade their island, massacre them, and appropriate their territory. At bottom all these cases are one. Everywhere takes place that which must take place conformably to the conditions and the forces in action. Nature witnesses impassively and indifferently the phenomena of which it is the theatre. The incandescent body, the oak, the stag, the Tasmanians bear down with equal force in its balance. To living bodies as to inert bodies, nothing is due; there is no justice.

Let us now look at the individual and place ourselves at his point of view. He possesses his particular organisation, of which he is not the author, and which it is without his power to relinquish. As Spencer said, "he is subjected to the effects of his own

nature and of the conduct which it involves."[1] It is due to him, therefore, that his acts should have the consequences which they logically imply, that he should reap what he has sown. Upon this condition only is he responsible. If his ego has been deceived, if he has wrongly judged what it is best to do, if he has suffered habit to produce the act, and has not intervened to modify it, if he was distracted or indolent at the moment, if he has reasoned falsely, he suffers the consequences. But if he has been correct in his forecasts and judgment, the benefits and the profits belong to him. This is the conformity of ends to acts,—organic or physiological justice. In the case of the wolf just mentioned, it was justice that its perseverence was crowned with success, whereas in the case of the stag it was unjust that, having put forth his utmost powers to escape a danger, it was after all devoured. A mother carries her infant during the period of gestation, brings it forth in pain, nurses it, and lavishes her care upon it; it is unjust that she is not recompensed and that the child dies. But the following is a complicated case. Two men struggle with weapons which each has at his disposal. The one has greater courage, the other greater skill. Each have a claim upon recompense, but one of them conquers. Where is the justice? From the point of view of nature there is none, for both have obeyed their organisation. The stronger has conquered the weaker. But from the particular point of view of each, justice has been done for him who, having put forth his utmost powers, has succeeded; and injustice has been done to him who, having achieved the same end, was nevertheless vanquished. Individual justice, therefore, is relative. Yet even in this restricted form it has wide import and applicability, for it engenders personal responsibility, and so becomes the moving cause *par excellence* of all human activity, involving the reward or punishment of acts, and impelling the ego to be ever alert for intervening, for adapting its commands to the circumstances, and for looking to its interests. If there were no such justice sanctioning responsibility, conduct would be without a rudder.

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[1] Herbert Spencer. *Data of Ethics. Justice.* 1891.

It may be asked if this responsibility has aught to do with the acts or with the intentions which have inspired the acts. Certainly habits frequently assert themselves without intervention on the part of the ego, but in not interfering it has done wrong and should suffer the consequences. Acts are the only material which lends itself to judgment. Intentions, and the motives from which they spring, cannot be analysed; they form an inextricable labyrinth. The ego and its acts, whatever they be, are solidary and compact.

We have now come to society. Solidarity, as has been said, involves duties on the part of the individual, while reciprocally society has duties which it owes to individuals. Each in its turn is bound to receive its due. Hence social justice,—or the regulations which control and sanction the relations between the two transacting parties. It is a necessity, at once theoretical and practical, for the perfect functioning of these relations, just as above individual justice assured the perfect functioning of the relations between acts and their effects. It renders the individual responsible to society and society responsible to the individual. It is the sanction of the two responsibilities.

But we have seen that theoretically all individuals stand upon an equal footing in society, that is to say, have the same rights and the same duties; for which reason social justice is sometimes defined as the law of equal liberty. On the other hand, social rights and still more so social duties, at least such as society judges to be most indispensable, are precisely defined by the laws, as are also the punishments which ensure their observance, but not the rewards which crown their fulfilment, for to these little thought is given. And hence this other definition: social justice is the law itself, or from another point of view the apparatus and the means designed to ensure obedience to the laws.

Let us recapitulate. There is no justice in nature. In the individual and with respect to that individual, a relative justice exists, which is entirely physiological and is the sanction of his acts, the source of his responsibility, the stimulant to his activity. In society a conventional but necessary justice exists, without which all would be anarchy, which is the sanction of the correctness of

the relations of the social body to individuals, and likewise their guarantee.

Nothing, we believe, shows more clearly the profound difference existing between nature, the individual, and society, than the different acceptation in these three cases of the words which we have just examined. We might stop here and conclude directly regarding the questions which were restated at the beginning of the present chapter, but we must first insist upon a few points in the mechanism of the social evolution which we have skimmed in the preceding chapters.

* * *

Society not being a product of nature but a product of man, evolution in it presents differences which have not been sufficiently remarked or insisted upon. At first it is natural, or such as circumstances and the regular play of individualities have made it, or semi-artificial, namely such as the conscious or unconscious will of man has shaped it. It may even be entirely artificial, if it has been built up altogether by man, regularly and methodically interfering with a knowledge of the causes at work and with a well-defined end in view. Social evolution has individuals as its agents, but as its effects a line of permanent results surviving individuals, possessing in some measure an existence of their own, growing, modifying, selecting, and culminating in a majestic *ensemble* independent of man and of the causes which have given it birth.

Let us first look at the agents or initial factors. The first, as in the evolution of all animate beings, is the expansion of life, and in this particular case social life, that is to say, increase of population, of needs, and of faculties. The second is the variability of individuals, giving rise to individual differences or variations.

We shall begin with the latter, and first take up a few physical characters, such as they are exhibited in anthopometry by figures showing the degree of frequency of the variations about a maximum centre, which represents the type of the character in the group studied. We shall borrow the data from our *Éléments d'anthropologie*,[1] condensing them to the limits of necessity.

[1] Pages 338, 442, 536.

The height of 424,215 Italian recruits from 20 to 21 years of age varied according to Pagliani as follows:

HEIGHT.	RELATIVE FREQUENCY.
Above 1.80 metres	6 in 1,000.
From 1.80 to 1.70 metres	142 in 1,000.
From 1.70 to 1.60 metres	528 in 1,000.
From 1.60 to 1.50 metres	275 in 1,000.
Below 1.50 metres	40 in 1,000.

In 1,000 Parisian skulls of the masculine sex, the cephalic index, or the ratio of the width of the skull to its length, varied, according to measurements which we ourselves have made, as follows:

CEPHALIC INDEX.	FREQUENCY.
Above 85	in 87 skulls.
From 85 to 80	in 268 skulls.
From 80 to 75	in 429 skulls.
From 75 to 70	in 206 skulls.
From 70 to 65	in 10 skulls.

The weight of 183 masculine European brains from 25 to 35 years varied according to Broca and Bischoff, as follows:

WEIGHT.	FREQUENCY.
1500 grammes and above	25 brains.
1500 to 1400 grammes	44 brains.
1400 to 1300 grammes	70 brains.
1300 to 1200 grammes	39 brains.
1200 and less grammes	5 brains.

It follows from this, that in dealing with the variations of a given character we have to distinguish between the variations which are oftenest repeated in a series and which form the mean group, and those which range above and below the mean and decrease in point of frequency, the extremes in both the higher and lower scales of variation being the rarest variations.

The same is true of sensory and psychical characters. Weismann remarks that while some persons are absolutely incapable of distinguishing between two adjacent notes on a piano, Mozart could detect the difference of a fourth of a note between two violin-strings sounded two days apart. In our psychological laboratories individual variations in the duration and intensity of certain reac-

tions are now measured, but for psychical phenomena recourse must be had to descriptive observation.

These variations bear upon the general *ensemble* of the faculties, according as these are more or less felicitously balanced, that is to say, upon cerebral capacity, upon the mode of association of these faculties (which furnishes the most astounding diversity), or upon the quality of some particular faculty. With respect to each one of these points of view a scale may be formed running from zero to a very high maximum. At the bottom are the variations which denote a perfect absence of faculty, and low variations which give evidence of feeble functioning; the most numerous variations are at the centre; above we find the ordinary higher variations which steadily decrease in number, and at the top, finally, the rarest variations of all are found,—luminaries of the maximum brilliancy which alone emit more light than the whole series together. And from such a scale are produced innumerable intellectual categories: the incapable, the inert, the insignificant, the nulls, the automata, the impressionable, the incoherent, the ecstatic, the contemplative, the positive, the geniuses, etc.

Take a restricted example—the faculty of observation and induction. In 100 individuals 30 will daily pass by an object or be the witness of a phenomenon without seeing it; 30 will see it, but will only make it the occasion of a profitless remark or of some trifling conversation; 20 will distinguish in the object or phenomenon the particular point in which it differs from others; 10 will reflect a moment or so upon it; 5 or 6 will immediately induce from it some idea which they will connect with some other thought and store it up in their memory for later use; 1 or 2 at most will immediately see in it a gleam of light and make it the object of the most felicitous application.

Now the great discoveries,—and this by the way is the first ultimate proposition which I am desirous of establishing,—the great discoveries, I say, the general ideas which wing their way in advance of progress, the things which subsequently give rise to the most useful practical applications, are the product of these higher individual variations. A society restricted to inferior variations

would retrograde. A society having only mean variations, all other things being equal, would be immovable; and whilst the others round about it would move onward in the path of progress, it would remain behind. Every society which has any pretension to holding its own, or which desires to outstrip its rivals, is bound to see that the number of its *élite* individuals is kept constant or increased.

There is more besides. On the one hand the best of the higher adaptations may never come into the environment in which they can be put to use, and may so remain a dead acquirement. On the other hand, the mean or indifferent variations may meet with stimulants which will heighten their efficacy, or with conditions which are suited to their special application, and may so acquire fresh power. In other terms, a physical or an intellectual character derives its real value from the use which is made of it. An individual who in one kind of work amounts to nothing may be strong in one which is fitted to his capacity. Who does not know the infinite diversity of the talents and aptitudes of men! In the intellectual class some demonstrate their rare abilities in the arts, in the sciences, in literature; others in manufacturing and commerce, or in politics. Specialisation here advances far. In the sciences some show an aptitude for mathematics, others for natural history, others for sociology. Even in the same branch aptitudes are different. A person who is given to either botany, geology, or entomology, may be averse to research in the other branches. And even here again there are distinctions. In botany, for example, one person may be good in the description and establishment of species only, another good only in the physiology of plants or in the philosophical problems to which they give rise. A third is interested only in microscopic research or in horticulture. In society the division of labor is infinite; there are all sorts of places for all kinds of activities, for all variations whether high, mean, or low. Long ago Aristotle said that some individuals were born to obey, others to command. In a manufactory where all the employees have the same education, one will never be anything more than a good workman, another a good book-keeper, while a third will be a good foreman, although incapable of being the superintendent. Among the

managers themselves, one is best fitted for selling, another for manufacturing, and another for controlling the establishment generally. In the army it is the same. Some will never be more than common infantrymen, some never more than underofficers; a small number attain the rank of captain; the majority of brigadier-generals never become division-generals; very few have the ability to command an army corps.

In short, there are high and low occupations in society for every one, just as there is an ascending and descending scale of aptitudes among individuals. Yet the two factors, the proper aptitude and the proper place in which to make good use of it, must be made to meet. Each must seek his path in life, essay success in different directions, and if possible find the place where his qualities may be best utilised and his defects entail no drawbacks. The very things that are intolerable defects in one position may be the very best of qualities in another. Nothing can be more rigorously true than the saying, "The right man in the right place."

In society the natural inequality of men loses therefore part of its repellent character. Individuals who are high in the scale for one task are often low in the scale for another. An average individual sometimes renders a greater service in the right place and while performing a work that is much in demand, than an individual high in the scale of capability does by performing a work which is little in demand. It follows that all the efforts of a society desirous of procuring for the mass of its members ready and ample satisfaction of its needs is bound to favor everything which tends to put in the hands of individuals the means of finding out for themselves the best occupation for their faculties, for augmenting their present value, and for realising their special and peculiar happiness.

There is a third reason why society should favor emulation, competition and struggle,—three things which hang together. The activity of an organ, of a function, or of a faculty has the effect of increasing its power and of differentiating it in the direction of the work it is doing. The variations which are most used, and which consequently are most enhanced in the scale during the life of the

individual, are those which have the greatest tendency to repeat themselves in descendants and, if the same exercise is continued, to be confirmed in the general line of descent. A laboring man lifts so many kilogrammes every day, and finally by exercise succeeds in tripling the amount. His son, if he resembles him, and if he works at the same occupation, will attain a higher figure, and will bequeath to his son the predisposition to increase the amount even more. There is evidently a limit, but the muscular force incessantly stimulated in each generation will reach a higher mean than that which would have been attained had the individuals of the series suffered their muscles to be inactive. No hypothesis of Weismann can alter the fact. It is the same with intellectual variations. They will have a higher place in the scale in families which exercise their brain than in those which only exercise their muscles, if the heredity be of the right kind and renders its assistance. It is this that explains the transmission of individual characters acquired by usage or by lack of usage. An indifferent variation, spontaneous in a family, say a special conformation of the ear, the nose, or the chin, some little peculiarity of movement, some peculiar method of thought, will be perpetuated for generations if the chance of marriage alliances operates in the right direction. *A fortiori* when the variation is not indifferent, when it is utilised, augmented by labor, the chances of transmission are greatly increased. The activity which the search for a better employment of the faculties engenders is, therefore, independently of the material products which it yields, the factor *par excellence* which makes for the amelioration of individuals. Every society that has any thought of the morrow, that is bent upon perfecting the species and on rendering the path of life more fruitful to its successors, is bound to respect struggle, if not to encourage it.

We pass to selection in society. Does it take place here among variations which have been utilised just as it does among animals? We know its mechanism in the latter. The strong, possessed of variations which are perfectly adapted to the situation, are perpetuated, while the feeble who possess variations which are imperfectly adapted are eliminated.. The law is the same with man

living in a state of nature, whether alone or as the chief of a family. It is the same with primitive peoples who as yet live only upon game and the fruits of the earth. Those who live in favored regions prosper, while those who are forced into sterile regions, whether very cold or very hot, but without water and without game, vegetate and pass away. Later among barbarians of all stripes, among civilised nations and even in the present day when war intervenes with all its horrors, the same selection by death and the suppression of reproduction continues. The cleverest and best armed nation carries the day. In this way a large number of peoples have disappeared whose names have not even come down to us. And we have had in recent times a forcible instance of the phenomenon in the extermination of the Guaranis and the Tasmanians. The primitive races, of which rather the evidence than the actual line have been continued to our day, have been produced by differentiation and the successive elimination of the poorly adapted at a time when natural selection operated in all its original splendor as it does among animals.

But apart from these cases, and as we go farther away from the primitive phase, selection falls off in intensity and changes its character. The first cause of this is the development of intelligence. According as man learns to protect himself against the elements, and finds means of existing where formerly he perished, artificial selection associates itself with natural selection. What else is agriculture, domestication and rearing of animals, exchange, industry, association and changing of customs, if it is not the intervention of the hand of man modifying his original conditions of existence as he now himself modifies the vegetable and animal species which he desires to perpetuate for his own use and pleasure. A second complementary cause of the falling off of selection in the human species is the facility with which the experience acquired in the art and conduct of life is transmitted from father to child, and from the tribe generally to its component members. In animals this transmission operates only through habits or instincts which require a long time to become established. In man, thanks to his possession of language, and to the prolonged space of time during which he

lives in his youth with his parents, and also to tradition which is constantly adding to its store, this education is rapid.

The most patent result of selection in more or less civilised epochs has been the division of society into classes, the one satisfying both its necessary and its superfluous needs, the other satisfying within the barest limits the first only, but still surviving and reproducing itself. The abyss which separates them does not, nevertheless, prevent them from mingling together, the higher classes appropriating the women of the lower. As to mortality, if misery causes it to be greater in the lower classes, in the higher it is augmented by war which these classes make their profession.

War, to which we may here refer again, also changes the character of selection. In the beginning the vanquished were taken and eaten, then they were made slaves, with their existence, at least, assured. For a long time war was a hand-to-hand conflict; courage and strength were the conditions of success; natural selection took its regular course. But when fire-arms were invented death was dealt at a distance without distinction. Selection was transferred from individuals to nations. To-day the change is even still greater. Military conscription seizes upon the strong and leaves behind the weak, who thus become the favored in life.

Even within classes themselves, struggle has changed its character in civilised societies. Its object for individuals is no longer survival, but a greater or less satisfaction of needs and particularly of superfluous needs—the desire for comfort, riches, and higher positions than those in which they are born—the highest possible in fact. In the last century the serfs, grouped about their lord, no longer struggled; they lived wretchedly, but they still lived. But yesterday our peasants were in the same stage. A majority of the proletarians aspire for nothing but slight improvement. In our days any individual having the least disposition to work and to save, can always sooner or later procure a relative competency. Struggle assumes considerable proportions only in the higher classes where there is an unusual need of superfluous pleasures or unbounded ambition. And even in these conditions death is rarely the consequence of failure. What is left of natural selection is a

minimum. Huxley estimates that the social stratum in which it is still operating is represented in England by scarcely five per cent. of the population.

This change in the consequences of struggle, which is now nothing more than normal emulation and simple competition, is in itself a sufficient answer to those who would eradicate it on the grounds of fraternity. The only thing of moment is so to regulate its operations as to prevent it from ever reverting to what it was in primitive societies and among animals. To-day society takes care of its idiots, its cripples, and its orphans; it has asylums of all kinds, and homes and retreats for the aged. Medicine allied with hygiene has almost doubled human longevity. Statistics have shown that the birth-rate is greater among the poor than among the rich, and greater in the country than in the cities, whatever the causes for it may be. Darwin himself admitted that civilisation was opposed in many ways to the free action of natural selection. The truth is that it has been replaced by an unconscious artificial selection which has other effects.

Has this change any connexion with the curious and paradoxical proposition which has been set up, that the average intelligence of man has not increased in modern civilisation as much as might be expected, and that between us and the Greeks of Pericles, as Gladstone and Galton say, and between us and the men described by Shakespeare in the time of Elizabeth (Huxley), the difference is not striking. If we took into account the population, the number of illustrious names belonging to the civil life which antiquity has transmitted to us would be even greater. But there is a distinction to be made. Certainly the Homers, Sophocles, and Aristophanes, the Socrates, Aristotles, and Platos, the Demosthenes, the Phidiases, and Appelles are more numerous and have not been surpassed by the poets, artists, and philosophers of our days. But the Archimedes and the scientists are rare and obscure. And there is no cause for astonishment at this. In the first place a career in letters and in the arts, that is, of thought and of imagination, was easy then, while in the sciences it was difficult. In the second place, literature and the arts are subjective products inher-

ent in individuals, in their experience, in their *a priori* reason, while the sciences are objective products requiring anterior preparation and long series of observations, and demanding the exercise of reason *a posteriori*. I admit that Hippocrates and Galen, and in more recent times Sydenham, if they had possessed the anatomical and biological knowledge of our day, might have equalled our present medical celebrities. I believe that Aristotle as a naturalist, or, taking a man nearer to our time, Descartes, would in the position of Pasteur have been led to the same discoveries. But this cannot be proved, and as a matter of fact it is the average type that must be considered and not the higher individual variations which are met with in all times and in all races. In literature and in the arts one can be a genius in any epoch. In the sciences it is impossible; one depends upon one's predecessors; one can apply only what others have gathered or prepared for him. The proposition in question, therefore, cannot be accepted without a more profound examination than has been given to it by such authors as Kidd, for example. Having no object in view but the establishment of the truth, I have several considerations to advance in its favor, considerations which have long been patent to me.

Intelligence is the product of several anatomical factors, among which the most accessible to comparison is the volume of the brain and when that is lacking, the volume of the cranial cavity which holds it. The brain is extremely rudimentary in the most ancient mammals. It increases in size as we go down the ages, notably so among the primates. In passing from the anthropoids to man, its weight is increased threefold almost, at a single bound,— a fact which renders the volume of the brain the cardinal anatomical characteristic of man. In the human species itself pronounced average differences are found among the great principal races. In the Java and Neanderthal race, the first which is known to us, the cranial capacity is 1,000 centimetres at most. The negroes of Africa have on an average in round numbers about 1,400 centimetres, the negroes of Oceanica 1,450, the yellow races 1,500, and the whites 1,550. (Cubical measurements made by the process of Broca.) These differences may be explained by the selection which

has operated among men in the state of nature, and which has differentiated these races. There are even in the black and yellow groups mean deviations which are also explained by selection. Among the white races it is different; the average deviations are feeble and not what the Darwinian theory would require. Between the races of the Neolithic and the Bronze ages and modern Parisians; between the Parisians of the twelfth and the nineteenth centuries; between the Egyptians of the fourth and the eighteenth dynasty, there is no notable difference. However, the second anatomical factor of intelligence, the development of convolutions in the brain, may have replaced in a measure the increase of volume; but this factor does not lend itself to a comparison of averages. Everything else being equal, a highly endowed intellectual individual may have fine, close, and numerous convolutions with a small brain. For instance, Gambetta. In fine, the question is still an open one; on one side the disappearance of selection explains the existence to-day of a less average degree of individual intelligence than should be expected; on the other the activity of the brain which continues undiminished must tend to increase either the volume of the brain or its convolutions.

Selection in our present societies still operates, but in a different form, and without causing the elimination of the less fit by death. The impulsion, revealed by anthropology, which urges large classes of individuals into the same path of life, is among the number. The following is an example. We know that the Anglo-Saxons and Scandinavians have as a pronounced physiological character their spirit of initiative and of emigration, and as a prominent physical character their high stature. Now, I have shown[1] by the aid of the statistics of Gould, taken during the war of secession, that if the corresponding series in the United States and in Europe be compared, the height is always greater in the United States. Further, if we make the same comparison between corresponding series in the East and in the West of the United States,

[1] P. Topinard, *Éléments d'anthropologie générale*, p. 452, etc. Paris, 1885. Publisher, Vigot frères.

the stature will be found to be greater in the West. Consequently, setting aside the influence of a change of life and of environment for reasons which I cannot stop to give, the conclusion is evident that the majority of Anglo-Saxons have in their physical and physiological characters been twice subjected to selection: first in emigrating from Europe to the United States; and then again from the East to the West. It is by some such process that certain industrial cities attract the brachycephalic population of the country, and others the dolichocephalic. Marriage operates the same as selection, varying with the country. The professions also exercise a selection of this kind. We have spoken above of military selection. The hospitals also have a selective influence, the mean weight of the brain is here much less than in individuals taken from the enlightened classes.

To sum up, the evolution of societies takes place through the agency of individuals whose activity, being hyper-stimulated by competition, accentuates and develops variations in the direction of the best adaptation to the conditions. It is selection, if you will so have it, but selection by work and not by death.

What is now to be considered are the external products of that activity,—some immediately consumed by the individuals, and others persisting after them, accumulating, reacting upon one another, arranging themselves in groups, and giving rise in their *ensemble* to that marvellously progressive movement which is called civilisation, a movement which was already well pronounced in Græco-Roman antiquity, which then came to a standstill, began again scarcely four hundred years ago, gradually quickened its velocity, and has taken on in the last forty years so great an intensity and momentum that those who have been able to follow it as we have done, are stricken dumb with astonishment, and ask to what it will come, even in the period which is immediately before us.

The evolution of men, with which anthropology is concerned, must not, as we have said, be confounded with the evolution of societies, which is properly the subject-matter of sociology. The one leads to the other, it is true, as the cause to the result: the "cause" being the individuals which succeed each other and die, the

"result" their works which remain after them. These last we have traced and described in the preceding chapters, in speaking of the family, of social forms, of manners, of institutions, of religion, of sciences and philosophy. They are of every class,—physical, intellectual, and moral. They are handed down by language, example, habits, laws, traditions, songs, writing, and printing, and by the objects collected in our museums of art, ethnography, etc. To trace their evolution, to describe how they have followed one another and how they are interrelated, would be to write the detailed history of every branch of knowledge, of every profession, of every industry, of every science, beginning with history, so called, its controlling ideas, general and particular. The broad survey which we have attempted is insufficient. It is in the details that the bonds of connexion are clearly seen. Take, for instance, medicine. To sketch its history even in broadest outlines, one would have to show Hippocrates, collecting his first observations in the art of healing, and attaching memoranda of them to the columns of the temple; the physicians of antiquity dissecting monkeys in order to study the anatomy of man; the latter science arising in the Middle Ages with Mundinus and later with Vesalius; physiology following with Harvey; histology and the many remaining branches not making their appearance until the present century; every new acquisition being the result of others which precede it, each coming in logical order and at its right time. Weismann has written a beautiful chapter on this subject, taking music as his example. He has emphasised how necessary it is to separate individuals from their products, which have their evolution apart. He has separated what I should call musical art from musical science or technique, springing from a few notes constantly repeated, and rising step by step to the highest forms of symphony. But the really most beautiful example, perhaps, of this secular accumulation of the works of billions of individuals who have now disappeared, is undoubtedly the edifice represented by our legislative, administrative, and financial organisation, as it stands to-day. Imperfect, as it may seem to us, and constructed fragment by fragment, retouched, retrimmed, altered, co-ordinated, it is still an

admirable creation. Our laws in France are made up of the Franco-German law, the Roman law, the canon-law of the Church and the successive additions of kings, parliaments, provincial and general estates. In the Revolution they were overhauled and broadened to suit with the reigning ideas of individualism. With Napoleon I. they were overhauled again and made to conform to the prevailing notions of centralisation. Since then they have never ceased being re-elaborated; to-day there is not a minister nor parliament who is not desirous of leaving upon them the imprint of his existence, either by overturning them or improving them.

Every society has contributed to the erection of edifices of this kind. Whatever it has added of its own constitutes its particular patrimony which it transmits enlarged to posterity. Nevertheless, it is distinctive of these social acquisitions, to spread without losing their value, to infiltrate themselves in all directions, and so to become the common patrimony of all civilised mankind. From this treasure, which was very small in the time of the Chaldeans and Egyptians, which was much larger in the time of the Greeks and Romans, and which has been prodigiously augmented in our epoch, all derive profit. Every one draws from it in proportion to its magnitude at the time in which he lives. A splendidly endowed individual might do without it, in the strictest sense, but it would be renouncing his relative chances of success; he would be in the situation of a man in the state of nature. The poorly-endowed individual, on the contrary, who drew largely from it, could arrive at the best results. It might almost be said that in the struggle for existence the treasure amassed by predecessors is worth perhaps even more than personal qualities. Thus, a person starting out in life, and having aspirations in a certain profession, finds ready what his predecessors have learned and perfected in that profession, and what has cost long centuries and entire lives to accomplish. In a shorter or longer time he will be conversant with what is known and will not have to begin *ab ovo*. He enters upon his path at the place where it was left by his predecessors; he has nothing to do but to march on and to extend it, till the day when he in his turn will leave it to his successors.

The marvellous spectacle which the present age offers is therefore not proof of an average intelligence far transcending that of our predecessors, but the result of accumulated capital yielding dividends which constantly grow greater. This is the great economic law which we find in social evolution, just as we do in all things, and which our socialists refuse to understand. The power of the individual of our day has been increased a hundred fold in comparison with the individual of times past who did not have this capital at his disposal. Thus the principal object of the system of life in society is attained,—the multiplication of the powers of man, and that not because union makes strength, but because each profits from the capital which his predecessors have left him and so is enabled to produce more. It must be admitted, however, in justice to all the facts, that never did the individual display more activity than now, and that never were larger numbers engaged from all classes. So also the characteristics of our end of the century is in all branches of thought as well as practice an over-production, not because intellectual capabilities are greater but because the struggle has its full effect, because the higher individual variations are less wasted and the average variations better find their place, and so, let us say again, because the capital which we have inherited is immense.

We may now conclude, and shall give in a last article our practical solution of the problem.

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GOD IN SCIENCE AND RELIGION.[1]

"POSITIVE knowledge," says Mr. Herbert Spencer, "does not, and never can, fill the whole region of possible thought." However much knowledge may "grow from more to more," there must needs ever be, for our limited capacities, a limitless residuum of the unknown. Still we must perforce think of this unknown, guess at it, form some conception of it, and in some way or other express our conceptions. And we can only do so in terms of what we do know. We must in fact use "symbols."

Undoubtedly the modern philosophy which resolves all things into matter and energy, and accounts for all phenomena by the interaction of these two categories, seems to many minds to have left no room for God. "I have no need of that hypothesis," says the French savant. But the mind will never be satisfied with such a negation. This is simply "to make a solitude and call it peace."

To believe that the human intellect is merely the last and highest product of evolution, the mere resultant of the interaction of matter and force, and that it will come to an end when this globe grows dead and cold, is impossible. That there is nothing higher, vaster, nobler, in all this universe, than the human mind with its limitations, is incredible.

To adopt Mr. H. Spencer's words: "We have an indefinite consciousness of an absolute reality transcending relations"—"an inscrutable power manifested through all phenomena"—"an Ulti-

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[1] Thoughts suggested by Dr. Carus's essay in *The Monist*, April, 1898, on "The Unmateriality of the Soul and God."

mate Reality which underlies all phenomena." This "Ultimate Reality" of the philosopher is, to the theist, God.

But the question—What *is* God? What is the nature, the "suchness," of this Ultimate Reality?—must ever remain insoluble. The words inscribed on the Temple of Isis in the Childhood of Religion, are true still:

Ἐγώ εἰμι πᾶν τὸ γεγενὸς καὶ ὂν καὶ ἐσόμενον καὶ τὸν ἐμὸν πέπλον οὐδείς πω θνητὸς ἀπεκάλυψε·

"I am all that was and is and shall be, and my veil hath no mortal ever lifted.'

Still we must think, must guess, must frame theories. And it is remarkable that in those theories, among all nations, in all ages, there should have been so much agreement, as Mr. Edmund Noble has pointed out, in his valuable article on "Some Parallels Between Theology and Science," in *The Open Court* of April last. This article suggests that a *modus vivendi* might be arrived at by all "seekers after God" (to use St. Paul's phrase, Acts xvii. 27). All the various terms used to express the "Ultimate Reality" seem to be aiming at the same thing: although whatever "symbol" is adopted must needs be inadequate, owing to the limitations of thought and, still more, of language; "the incompetency of the conditioned to grasp the unconditioned."

The Christian theist says, "God is spirit." But the question arises, What *is* "spirit"? Is it matter? Is it energy? Or is it a *tertium quid*? Judge Chase's view, which is that of most believers in the immortality of the soul, has been rightly challenged by Dr. Carus (p. 426) as being in fact a materialist one: for his d_2x, attenuated to any degree, is still the product of the factor x. Mr. Herbert Spencer's formula, "The infinite and eternal energy from which all things proceed," would seem to point to energy as, in his view, the equivalent of the theological "spirit." But he himself shows elsewhere how impossible it is to conceive of energy as abstracted from matter. If then neither of these can be accepted as definitions of (the theological) "spirit," we must have recourse to the "*tertium quid*." And how shall we name it?

It seems to me that the *idea* of Plato—the *eidos* of the Greek

Fathers—the *substantia* of the Latins—the *form* of modern philosophy, are, one and all, efforts to express the same thought of pure being: and all fail in the last analysis, because they are but "symbols" to express what "transcends the bounds of distinct thought."

The word "substance" in mediæval theology, and in such documents as the Athanasian Creed, is an endeavor to express the "underlying reality," apart from all "accidents," that is to say in modern terms, apart from all matter and energy. But the word "substance"—and with it the idea it was intended to connote—has through time become perverted: for now, when we speak of a "substantial house" or a "substantial dinner," we mean the very opposite of "immaterial."

The same danger of misapprehension and of perversion awaits the word "form": for "form" inevitably suggests "shape"; and "shape" is too intimately connected with the material "accidents" of any "substance" to be abstracted from them even mentally.

Dr. Carus's illustration: "That $1+1=2$ is eternally true, though matter had never existed"—may be demurred to. For when we think or speak of 1 or 2, we must needs ask, one *what?* or two *what?* The more appropriate formula would seem to be, $0+0=0$, or $0\times$ (anything whatever) is still $=0$.

Every term that the theist can use is open to objection from the same cause, viz., the limitations of thought and of language. Such is the case with the word "person" or "personality." We use it becanse it is the best we can do. Professor Le Conte (*Evolution and Its Relation to Christian Thought*, Part III. Chap. 6, p. 341) well says:

"I have used the word personality as expressing the nature of God. But let me not be misunderstood. I know well we cannot conceive clearly of an infinite unconditioned personality. Deeply considered it seems nothing short of a contradiction in terms. All I insist on is this: In our view of the nature of God, the choice is not between personality and something *lower* than personality, viz., an *unconscious force* operating nature by *necessity*, as the materialists and pantheists would have us believe; but between personality as we know it in ourselves and something inconceivably *higher* than personality. Language is so poor that we

are obliged to represent even *our* mental phenomena by physical images. How much more, then, the divine nature by its human image! Self-conscious personality is the highest thing we know or can conceive. We offer Him the very best and truest we have when we call Him a person; even though we know that this, our best, falls far short of the infinite reality."

To this agree the words of Mr. H. Spencer (*First Principles*, Part I. Section 31).

"Is it not just possible that there is a mode of being as much transcending intelligence and will as these transcend mechanical motion? It is true that we are totally unable to conceive any such higher mode of being. But this is not a reason for questioning its existence; it is rather the reverse."

The Christian theologian can accept all that.

Mr. Matthew Arnold in *Literature and Dogma* satirised the word "Person" as being anthropomorphic, and sought to avoid all anthropomorphism by his formula, "The Eternal Not-ourselves that makes for righteousness." But Dr. Abbott (in *Through Nature to Christ*) pointed out that the very word "makes" subjects Mr. Arnold's formula to the charge of anthropomorphism, or something lower. An amusing instance of avoiding Charybdis only to fall into Scylla was given by Rev. Dr. McQueary, who a few years ago startled the Christian world by forsaking the "orthodox" faith. He published a work (I have it not by me and forget its title) as his Apologia, in which he gives expression to his recoil from the "anthropomorphism" of Christianity. But when he sets out to give us his own views of the relation between God and the Universe, he says he believes that "God secretes nature as a snail secretes its shell!" Surely any amount of anthropomorphism is superior to this gasteropodomorphism!

We might, indeed, speak of super-personality, as Judge Chase and Dr. Carus suggest: but I fear such a term in ordinary conventional use would convey to the minds of the many no meaning whatever, however appreciated by profounder thinkers.

The illustration which Plato gives in the *Phædo* of the soul being the Harmony and the body the material Lyre, is very beautiful; so also is Dr. Carus's illustration (p. 431) of the rainbow as distinct from the shower on which it appears. The rainbow re-

mains the same, while the raindrops are ever changing. So the ego of the individual persists, while the atoms of his body are in a constant state of flux. But the objection raised by the companions of Socrates was not fully met by him, viz. Though the lyre be not the music, yet when the lyre is destroyed the music is non-existent save as a memory. So when the shower is over, the rainbow is no more. Neither the music nor the rainbow can exist without air-vibrations. And the question forces itself upon us: When the body is dissolved, does the soul—the ego—survive only as the tune or the rainbow survives, i. e., as a memory, or idea, or form, of what once was, or of what will recur when the lyre is reconstructed or the shower falls again?

The popular phrase "the immortality of the soul" and the old arguments on which it was based, viz., that the soul is an immaterial essence, and therefore indivisible, and therefore indestructible, are not, we admit, scientifically tenable. But this does not disturb the Christian, for in fact "the immortality of the soul" is not an article of his creed. We confess, "I believe in the resurrection of the dead." Now, to many this may seem still more absurd than the doctrine of the indivisibility and immortality of the soul. But I think we may see our way out of this difficulty. Dr. Carus says (p. 439): "In the soul-life of mankind are the mansions in which there is room for us all. There we shall be preserved with all our peculiar idiosyncrasies in our personal identity." Every Christian will heartily assent to that: and I conceive the resurrection of the dead means that, and something more. We thereby imply that our future life will be—not a mere memory—not a vague, shadowy, purposeless existence of highly attenuated ether—not like the "shades" of the classics—but an organic one. There are "many mansions" in the Father's house, countless millions of globes around us. May not the Father transport us to some of these, with our memory of the old terrestrial life, "with all our peculiar idiosyncrasies in our personal identity"?—and yet in an organic form suitable to our new environments? M. Camille Flammarion, in his charming romance *Lumen* suggests this. And it seems to me that such an idea is quite compatible with the principles of Monism.

The music will again be heard when the lyre is reconstructed, or rather when a nobler organ is furnished to reproduce it. The rainbow will reappear under more perfect conditions. The ego will have its personal identity, but enlarged and glorified, with capabilities which we cannot now conceive, because in its new environment it will have its appropriate organism. And so we interpret St. Paul's words, that we shall be "not unclothed but clothed upon with our habitation which is from heaven" (2 Cor. v.).

After all, it is a comfort to think that all who hold "the Religion of Science" can come to a consensus on the scheme exhibited by Dr. Carus. We all believe in God the Father,—we all cry, "Nearer, my God, to thee!"—We all hold (p. 425) that "God is not only the Father, but also the Son . . . . God is not only the Logos as the world-order, but also the Logos that has become flesh."

These are the great truths: these, however much the "wise and prudent" may speculate as to the mode, are the truths that have all along been "revealed unto babes" (3 Matt. xi. 25), in babes' language, perhaps, but that was needful. The "babes," physical and intellectual, must ever form the vast proportion of mankind; the "wise and prudent"—the profounder thinkers—must always be the few. Is it not well, then, that we should have a popular and conventional terminology in religion for the "babes," even if we adopt an academic terminology to satisfy the "wise and prudent"? In other words, must we not have *always* an exoteric as well as an esoteric presentment of religion? Especially as they both mean the same thing; they both bear the same message, whether to the wise and prudent or to the babes:—"God so loved the world that He sent His Son."

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CURIOUS in the extreme, but in a measure venturesome, is the work of M. E. PRÉAUBERT, *La vie mode de mouvement, essai d'une théorie physique des phénomènes vitaux.* Life can no longer be regarded as a phenomenon which has a place absolutely apart from the regular chain of events of the world. Nor is it permissible even to say that it is incapable of being reduced to the facts of the antecedent sciences which furnish its conditions; and philosophical biologists refuse to be placed under any restraint in seeking its origin and explanation either by way of theory or experiment.

But where is the origin of life to be found? We have seen M. Le Dantec, who is a biologist by profession, seek its origin in chemistry. M. Préaubert, who is predominantly a physicist, seeks it in physics. For him, biology is a question of mechanics. Life is not a particular mode of chemical reactions, but predominantly a mode of motion; it has for its substratum not ponderable matter but the ether, and consequently is possessed of an intimate kinship with electricity and magnetism.

The albuminoid bodies, our author writes, are not life any more than iron is magnetism; they are simply substances which are *par excellence* fitted for being the vehicle of life. Life is something different; it is a motion of the mysterious ether. The vital movement, accordingly, is prior to the protoplasmic molecule. The beginnings of life may even be connected, and in all probability they must be connected, with the evolution of "globular lightning" so called, viz., with a vortex movement of a particular kind which

is susceptible of stability only in the midst of these albuminoid substances, in which the passage from the mineral state to the living unit is accomplished.

One cannot deny to M. Préaubert the merit of having supported his venturesome views by interesting arguments. He develops his thesis with great knowledge and conviction. Nevertheless objections to his position crowd forward. The author assumes at the very outset that "a dead body is not differently composed from a living body," which justifies his seeing in life a distinct property or energy introduced from without. But it is only too evident that this comparison of a dead body to a living body is founded upon appearance only, and that M. Préaubert becomes involved here in a false interpretation of morphological facts. I also criticise him for having quitted the path of possible explanation in order to enter that of impossible explanation. He neglects chemical phenomena, which border on biological phenomena, in order to pass at a bound to physical phenomena, whereas these last are connected with life only through the necessary mediation of the laws of chemistry which represent higher and more complex facts. We have here a fault of method, a fundamental error which vitiates the whole theory and leaves only its fragments standing.

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M. Cyrille Blondeau shows in *L'Absolu et sa loi constitutive*, genuine literary talent and comprehensive erudition, together with great philosophical vigor. Possibly he expounds his doctrine in too diffuse a manner; his work might have gained by being reduced; and the composition as a whole would have been better, I think, had M. Blondeau advanced more rapidly to his final chapter, and had made this the central point of his demonstration and views.

The doctrine of M. Blondeau is well indicated by the title of his work. A fundamental opposition exists, according to him, between the point of view of sensibility and that of reason. There is no bond uniting the operations of the senses to those of the mind. If the data furnished by the senses are the materials of mind, they

must nevertheless not be conceived as principles or as truths. The senses give us relative results only; but science must give us the absolute. Things are only relations; but they are relations within the infinite. The contradictions inherent in things from the point of view of science are dissipated in the absolute, which is necessarily undetermined.

But how can the consideration of the absolute, in which man is thus submerged, be made fruitful? What is its "higher law"—the law by which we can descend again from the universal existence formed by all the relations between phenomena, to the phenomenal world itself, in order to pursue there the necessary consequences of the supreme principle? This law is formulated as follows: "The mutual relation of the constitutive elements of anything whatever is in inverse proportion to their relation to the environment containing them." Or: "The force which goes to make up a whole, viz., any object whatever, is the opposite of the force which makes of that object a part, that is, an element of some other object. We have here, as M. Blondeau himself says, a new expression of the old principle of Anaximenes that the order of nature is merely the equilibrium of contrary forces.

This law, the author asserts, is really a "higher" law because it is not subject to any particular limit, and it does not depend, as particular laws do, upon facts which cannot have existed in the past, or on such as can ever cease to exist in the future. It clearly implies the infinity of being, because in the case of every single thing there must necessarily exist external relations for keeping up the relative equilibrium of its elements. Undoubtedly, "it is not possible to comprehend" this absolute and thoroughly undetermined being, but "that of itself is reason,"—a conclusion which will not perfectly satisfy either the spiritualists or the idealists, or even the majority of metaphysicists, who are bent on finding the explicative reason of the world in mind rather than in the principles of universal mechanics, abstract and comprehensive as its formulæ may appear.

The last work of M. F. Le Dantec, *L'Individualité et l'erreur individualiste*, is in the main a polemical composition. The author

recalls his conception of individuality, protests against the erroneous interpretation of the determinist doctrine by certain Catholic authors, and combats the thesis of the late E. D. Cope, according to which consciousness, instead of being an epiphenomenon, preceded the organism and was the *primum mobile* of all organic structure. I hold the same theory of the ego approximately as M. Le Dantec does. At least I am of opinion that it is only by beginning with determinism that we can hope to lay the foundations of a stable psychology. What philosophical biologists should start with is not in my opinion the existence of a spiritual substance or of a hypothetical virtuality, but the possible and probable signification of consciousness and mind in the economy of the universe. The best informed philosophy is not bound to prohibit flights of induction, provided its conjectures are always submitted to tried methods of experience, which alone can furnish solid data.

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M. GEORGES FULLIQUET in an *Essai sur l'obligation morale* takes up questions which have been treated a hundred times, and rethinks them after his fashion,—a salutary exercise for a young philosopher,—but in the present case, as it seems to me, unproductive of new views. For M. Fulliquet obligation is not a bond created by life, but a power (or an experience) imposed by God. Owing to moral obligation, there is something unchangeable in nature, despite the fact that this unchangeable something does not depend upon man. M. Fulliquet offers us, accordingly, a new formula for the doctrine of innate ideas,—a doctrine which appears correct or incorrect, according as the facts of consciousness which are declared innate are germs which are destined to evolve in the course of life or are products which require neither time nor effort to reach their maturity; in other words, according as experience dispenses with mystery or as mystery invades experience.

M. F. PILLON publishes *La philosophie de Charles Secrétan.* It is a good critical work on the doctrines of this philosopher, who certainly possessed some genuine merit as a thinker, but who in my opinion was not of sufficient importance to found a school.

The metaphysics of M. Secrétan, says M. Pillon, is merely a philosophical theory of the great Christian dogmas, and his ethics a philosophical theory of Christian morals.

M. Gaston Milhaud, in *Le rationnel*, claims creative power and originality for the human species, but he seems to understand by these words two distinct things, which are not equally clear. In his treatment of the Bacons and the Comtes he champions the rights of rational science, which must not suffer itself to be enthralled by the notions of sensible reality,—the right, namely, of constructing hypotheses or "rational laws" which serve to embrace in brief and simple formulæ the greatest possible number of facts. Science, in fact, is merely a way of thinking the world, and it is permissible to think it in various manners, in other words, in the manner which suits us best. But the value of our hypotheses always finds its conditions in the facts. It requires a concordance between *ideas* and *things*, and I do not understand very well the privilege which M. Milhaud claims for the Idea, which according to him is not determined either by immanent (subjective) solicitations or by the external (objective) solicitations which suggest it. Such a privilege supposes a doctrine of the human soul to which the author has not succeeded in giving a sufficiently precise and personal expression.

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The study of M. Henri Lichtenberger, *La philosophie de Nietzsche*, is the first to appear in France upon this philosopher, and will certainly find numerous readers. M. Lichtenberger has sought rather to tell the story of Nietzsche than to criticise him, and I think he has done well. Nietzsche has not a philosophy exactly; he is an *individual*, a psychological curiosity,—or, shall we add, a diseased personality? It would certainly be ungenerous to discredit absolutely the work of this thinker because he ultimately succumbed to insanity, and I do not mingle the least animadversion with my judgment of this unfortunate writer. I cannot refrain, however, from remarking with M. Lichtenberger that sensibility constantly determined and overruled the intellect in the case of Nietzsche; that his philosophy proceeded originally from senti-

ment, and that his reason varied with the disorders of his physiological health in a far higher measure than is ordinarily the case with sound and robust writers. Besides, Nietzsche is predominantly an artist, a man of emotion rather than of intellect. He constructed his theories according to the passions of the moment, and in order to justify or to allay those passions, without ever confining himself to an attentive or impartial observation of things. He is at once impulsive and logical, has a systematic bent but a disordered brain. The poet that he is, and the thinker that he is, conflict with rather than support each other. His most correct views seem disordered or chimerical. He exaggerates even the truth itself. His pages are filled with violence and bitterness, with *naïveté* and pride, with unbounded skepticism and infantile cruelty. In reading him, I obtain a higher regard for simple people and am surprised to find myself blessing "philistine" honesty.

If the work of M. Alexis Bertrand, *L'Enseignement intégral*, addresses itself mainly to French readers, it will nevertheless be interesting to a large circle of readers. M. Bertrand proposes the organisation of a secondary system of instruction designed for the masses of the people, and in continuation of the primary school a system of instruction so organised and so conducted that it would soon grow general and replace the classical system of our lyceums. In a word, it is the substitution of the modern for the ancient type. M. Bertrand appeals to the authority of two great names,—that of Descartes and that of Comte. The pedagogical work of the former is in general unknown, while that of the latter is misconstrued and disfigured at pleasure.

It would be ungrateful not to praise the effort of M. Bertrand. Eighteen years ago I defended with energy a project which was quite similar to this, and which was based upon the same thought. I had in mind the people of our towns and country districts whom I called "the bourgeoisie of manual labor." The only point on which I would criticise the author is that he has endeavored rather to crowd erudition into his work than to analyse carefully the social conditions which justify it; I could also have wished less literary elegance and more force. But we should remember that M. Ber-

trand is addressing in the first instance the university world where he will encounter numerous adversaries before acquiring allies.

With M. PAULIN MALAPERT, *Les éléments du caractère et leurs lois de combinaison*, we take up again the question of ethology which has been much studied of late years. It cannot be said that the science of character has as yet found assured principles in psychological physiology. It has simply been better formulated and been pushed to greater depths, which is in itself much. M. Malapert does not flatter himself with having advanced a definitive theory. He limits himself to the work of criticising and recasting. He takes exception to M. Pérez and M. Paulhan for having exhibited rather the manifestations and the forms of character than its foundations; he criticises M. Ribot and M. Fouillée for having simplified things too much. M. Ribot, according to him, has failed to recognise that there exists a *voluntary* as well as an *intellectual* class; he was wrong (but I do not think so) in not having seen in intelligence a secondary factor only. In accord upon this point with M. Fouillée, M. Malapert nevertheless criticises the latter for having adhered to the rigorous classification of Bain (*emotional, intellectual, volitional*) and with not having brought his classification into relation with that of temperaments, upon which it pretends to be founded. The classification which he proposes is a mixture of that of M. Ribot and that of M. Fouillée. In fine, M. Malapert establishes six principal classes which are purely abstract (viz., *apathiques, affectifs, intellectuels, actifs, tempérés, volontaires*); and these classes express simply the domination of this or that general psychical function without predetermining the aspects which that function covers in a reality. The sub-classes or kinds would then be obtained by intermixture, and the reciprocal influence of the principal traits. Thus the *apathiques*, for example, are sub-divided into *apathiques purs, apathiques intelligents*, and *apathiques actifs*.

Practically these six classes are acceptable, but theoretically are not so well justified. The author, in my opinion, has done wrong in placing upon the same plane classificatory characters whose physiological or psychological value is quite unequal and which are not sufficiently distinct. I shall say no more upon this

point to-day (I refer the reader to what I wrote upon it in *The Monist* for April, 1892, July, 1894, and for April and October, 1896). It remains to be said that M. Malapert believes that character can be a personal creation, and that free will is a force capable of affecting the transformation of the individual—an assertion which is correct or incorrect according to the qualities of character which we have in mind, or according to the "reactions" which we consider.

I shall simply mention my own book, *Les croyances de demain*,[1] and along with it the following works: by M. MAURICE PUJO, *La Crise morale* (Perrin, publisher); by M. ANDRÉ LEFÈVRE, *L'histoire, entretiens sur l'évolution historique* (Schleicher, publ.); by M. SIGHELE, *Psychologie des Sectes* (Giard & Brière, publ.); by M. A. VACCARO, *Les bases sociologiques du droit et de l'etat* (*ibid.*); by M. SOULIER, *Des origines et de l'état social de la nation française* (*ibid.*); by M. DOBRESIO, *L'Évolution du droit* (*ibid.*) and finally the work of M. A. ESPINAS, *Les origines de la technologie* (F. Alcan, publ.), a very learned work on which I should have liked to say something, and to which I shall probably have occasion to return.

L. ARRÉAT.

PARIS.

[1] All works previously mentioned are published by Félix Alcan.

DISCUSSIONS.

GOD IN SCIENCE AND RELIGION. REMARKS ON CANON LOW'S ARTICLE.

It is a great satisfaction to me to find myself in agreement on all main points with a theologian of Canon George J. Low's rank, a man of high standing in his own, the Episcopal Church, and just recently marked out for distinction by a Presbyterian university (Queen's University, of Kingston, Canada), which has conferred upon him the honorary degree of Doctor of Divinity. He scarcely takes an exception to any essential proposition of mine and goes so far as to concede in substance the symbolical significance of Church dogmas. He says:

"After all, it is a comfort to think that all who hold 'the Religion of Science' "can come to a consensus on the scheme exhibited by Dr. Carus. We all believe "in God the Father—we all cry, 'Nearer my God, to Thee!' We all hold (p. 425) "that 'God is not only the Father, but also the Son. . . . God is not only the "Logos as the world-order but also the Logos that has become flesh.'

"These are the great truths: these, however much the 'wise and prudent' "may speculate as to the mode, are the truths that have all along been 'revealed "unto babes' (3 Matt. xi. 25); in babes' language perhaps, but that was needful. "The 'babes,' physical and intellectual, must ever form the vast proportion of "mankind; the 'wise and prudent'—the profounder thinkers—must always be "the few. Is it not well, then, that we should have a popular and conventional "terminology in religion for the 'babes,' even if we adopt an academic terminology "to satisfy the 'wise and prudent'? In other words, must we not have, *always* "an exoteric as well as an esoteric presentment of religion? Especially as they "both mean the same thing; they both bear the same message, whether to the " wise and prudent or to the babes: 'God so loved the world that He sent His "Son.'"

There are minor points on which I would take exception to Canon Low, but I shall merely mention them without discussion, for they are mere side-issues, on which I trust we shall easily come to an agreement.

Language is not poor. It is true that language employs allegories and imagery; it represents the intangible by tangible similes. But that is natural and necessary.

Language transcends the sensory by imparting to it a spiritual significance. That is the method of language and so long as we can use language both for depicting all the realities of life including its spiritual truths and for communicating our highest and best thoughts to others, it cannot be regarded as poor. In my opinion language is rich. Think of its simple means consisting of a limited number of sounds; yet these sounds can become the vehicle of all the spiritual wealth of mankind. It is true that we sometimes—nay frequently, and always when our souls expand in spiritual growth, feel the dearth of new words to express the new thoughts and ideals budding in our hearts. In such a condition, it is true, we feel the poverty of language—but that is only the poverty of *our* language, not of language. A new expression is needed and, if the same need is felt by others, it will be found. A word will be invented to describe the new thought, and he who has felt its thrill and has become familiar with the connotation of the new term will be stirred by its sound and will rejoice at the power of the word. Words are the most potent realities in life, and the significance of words, if they express truths, is possessed of a pre-existence which has been from the beginning. The significance of language, the meaning of the word—i. e., of truth, which is the soul of the word,—is divine; it is eternal; it is the creative law shaping the world, the logic of facts; the *raison d'être* in the evolution of worlds. It is in and with God, being God Himself. And God becomes incarnate when the right expression is found for a truth.

This is good Christian doctrine and I believe that the author of the Fourth Gospel meant what he said:

"In the beginning was the word, and the word was with God, and God was the word."

The word, viz., the significance of sounds or the truth conveyed in language, although not a material thing, is a reality; it is the most powerful reality in life; it is God incarnate.

The message which the Fourth Gospel proclaims to the world, is that of the incarnation of the word. Of what use is God to us (God in any sense), unless he finds a dwelling-place in our bosom? The order of nature is a Moloch that mercilessly crushes whatever happens to conflict with its forces; but it becomes beneficial and its curses change into blessings, as soon as it is understood. This explains the truth of Christ's word: "No one comes to the Father except through me." It is through the word, through the comprehension of nature's laws, that we learn to appreciate the divinity of the cosmic order.

Here Matthew Arnold's famous formula fails to be satisfactory that "God is the power not ourselves that makes for righteousness." The philosophical significance of Christianity consists in the idea that God must be "a power in ourselves that makes for righteousness" God's divinity appears only in his incarnation as love, hope, charity, mercy, goodwill, in a word as moral endeavor. He only who sees the son, sees the father. Inquire into the laws of nature, and it may be that, considering the ruthless cruelty of its arrangements, you will turn away from life

with disgust; but feel the thrill of human sympathies and ideal aspirations, and you will find a purpose in existence; you will find a field of duties, you will find life worth living.

Man is essentially (as Noiré said) a speaking animal, and man's rationality is an incarnation of those eternalities of existence which we call the cosmic order. Man is divine, and the morally perfect man, the man who embodies the universality of reason as goodwill toward all, is God incarnate. His is the logos that has become flesh.

Life in itself is mere activity; but spirit is activity guided by reason. Reason, through language becomes incarnate in life, and thus spiritual life is begotten; for what is spirit but the rationality of life. Spirit is not a being endowed with language but language itself is spirit. Says Christ: "The words which I speak they are life and they are spirit."

Now the contention is frequently made that words or thoughts are realities only when living beings pronounce or think them; while we ought to bear in mind that words—if expressing a truth—are realities which exist for ever and aye. Canon Low says:

"That '$1+1=2$ is eternally true, though matter had never existed,' may be "demurred to. For when we think or speak of 1 or 2, we must needs ask, one "what? or two what? The more appropriate formula would seem to be $0+0=0$ or $0\times$ (anything whatever) is still $=0$."

This is the echo of the old nominalistic school, which regards the word as an empty sound, a mere *flatus vocis*, a convenient mode of expression without any objective significance. We must insist on the significance of the word and on the actual value of abstract truths. If the sentence $0+0=0$ be true, the other proposition $2\times 2=4$ is not less true. Canon Low would have the absolute truth of the purely formal sciences restricted to the zero equations $0+0=0$, or $0\times 0=0$; but the history as well as the philosophy of mathematics will reveal the remarkable fact that zero is an abstraction of much higher complexity and involving greater difficulties than concrete figures. There are, or at least there have been, mathematicians who hold the theory that while all the figures are real, nought is nothing, chimerical and unreal. Bear in mind that zero finds its counterpart in infinitude, and while neither zero nor infinitude are concrete things, they are symbols of real significance which serve to reveal important truths. Think only of such equations as

$$\frac{1}{\infty}=0;\ \frac{1}{0}=\infty;\ \log 1=0;\ a^0 \text{ (viz., any number to the zero power)}=1.$$

All equations and propositions are mere instances of rationality itself, which is possessed of an intrinsic necessity. Even if there were no material existence, if we could annihilate all the milky ways with all they contain, the purely formal truths would remain as true as ever. They are not substances, they are not things in themselves, they are not essences of any kind; but they are true and they are in-

trinsically necessary. Nor are they only true in the numberless concrete instances of facts, but also abstractly; and their application comprises the world of figures as well as the realm of the zero.

It is through the facts of experience alone that we become acquainted with the world of the superreal, of the laws of form, of intrinsically necessary relations, of uniformities, of the eternal as underlying the transient phenomena of sense-experience. The supersensible is given in the forms of the sensory world, but it exists independently of any single fact and also of the sum total of all single facts as absolute truth, as intrinsic necessity, as eternal law (or whatever you may call it).

The thoughtful among the theologians of the present day are powerfully touched by the monistic tendencies of the age, and the oneness of science and religion begins to make itself felt. The sentiment finds expression in prose as well as in rhymes, both in the pulpit and in the pews, in sermons and in hymns. The following anonymous lines are a faithful expression of this conception:

"God is Love," and God is Beauty;
God is Music, Truth, and Light;
God is Hope and God is Duty;
God is Morning, Noon, and Night;
God is Joy and God is Sorrow;
God is Pleasure, God is Pain;
God is Yesterday and Morrow;
God is Loss and God is Gain.

"God is Patience, Trust, and Trial;
God is Waiting, God is Zest;
God is Promise and Denial;
Purity, and Peace, and Rest;
God is Star, and Mount, and Valley;
God is River, Lake, and Sea;
God is Field and Crowded Alley;
God, the Lily on the Lea.

"God is Body, God is Spirit;
God is Whole and God is Part;
God is Word and All Who Hear It,
God is Mind and Soul and Heart;
God is all things that he sendeth
To the creatures of his love;
Sun and storm he wisely blendeth
Earth below and sky above.

The New York *Sun* publishes, under the date of May 27, 1898, the following item :[1]

"The Rev. Dr. Lyman Abbott of Brooklyn preached last Sunday a sermon in "which he gave a history of a change which has taken place in his theological "views during the last thirty or forty years, intimating that it represents a change "which has become extensive in the world of orthodoxy.

"He said that he began by believing in a personal God, Who 'dwelt on a "great white throne surrounded by His angels,' Who made the world and ruled it "as a King over men,' and Who 'sent His Son into the world to bear the penalty' "of men's violation of His law, 'and let men go free.' Dr. Abbott believed then "in salvation and the resurrection as taught in the Christian theology.

"His feeling and conviction, however, have changed radically. Now God is "to him 'in nature and its indwelling force'; the 'one underlying cause.' He rec- "ognises no longer 'a radical distinction between the natural and supernatural; "the natural is supernatural, and the supernatural is natural.' Creation is 'a con- "tinuous process.' 'Universally and continually creating,' God is 'not ruling over "creatures, but in them.' 'Christ is the condition of salvation, because Christ is "God coming into human life. Incarnation is no longer an episode standing by "itself.' 'Little by little God made Himself known to men, until at last He came "into one incomparable life.'

"Finally Dr. Abbott says that he 'no longer looks forward to a great day of "resurrection.' 'We are all in process of resurrection.' 'Death goes from the "cradle to the grave, and resurrection goes along with it.' 'Every spring is a new "creation.' 'The flowers that bloomed in Eden were not more created by the fiat "of Jehovah than those on this pulpit.' 'If your soul leaves the body, the body "crumbles and dies; so if God were drawn from the universe it would become "dust.'

As the pews are always more illiberal than the pulpit, the New York *Sun* adds the following comment:

"Dr. Abbott undertook to distinguish this from pantheism, but no such dis- "tinction is possible. His creed eliminates wholly the personality of God, and "makes of Him only a force in nature. 'There is,' he says, 'only one law and "force—God.' That of itself is a very good definition of pantheism. His God is "without the element of personality, and his Christ is only this 'one law and force' "coming into 'one incomparable life.' He does not speak of affection extending to "God as a personal Being, and what he says of the Incarnation takes away from "Christ all divine character, making Him human only.

"Such is the pantheistic creed confessed publicly by a Congregational minister "of this time."

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[1] This extract may not be reliable, for it is compiled by one who is greatly dissatisfied with Dr. Abbott's sermon.

Judging by the reputation of Dr. Lyman Abbott, we are inclined to believe that the famous successor of Beecher is not more pantheistic than we. There is, of course, a truth in pantheism, but pantheism as an identification of God and the All is wrong. There is a oneness but no sameness. But it is natural that one who has never been confronted with the philosophical problem of the existence of God will regard any solution offered by a thoughtful man as pure atheism, or as pantheism.

God is not a being, not a concrete individual, not an ego, thinking successive thoughts, yet He is a systematic whole, an organised entirety, a body[1] of omnipresent eternalities and necessities, bearing all the features that condition the rationality of personal beings and giving character to the world-order as well as being the standard of measurement for the moral ideals of all living creatures. God is distinct from the sum total of concrete existences. He is not a pantheistic All-Being, but the truly supernatural Allhood of all existence, including all possible existences. P. C.

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[1] "Body," not in the sense of a material object, but in the sense of a system.

BOOK REVIEWS.

THE WILL TO BELIEVE. And Other Essays in Popular Philosophy. By *William James*. New York, London, and Bombay: Longmans, Green and Co. 1897. Pages, xvii, 332.

The position of the militant critic of this book is an extremely delicate one. We have in its brilliant expositions, its elucidative insight, its sincerity and wholesomeness of purpose, so much to be thankful for, that it would seem the part of captiousness only, to submit it to even the kindliest stricture. But the book carries upon its own front the imprint of its merit, and praise from us would be supererogatory. It is one of the most inspiring and suggestive pieces of philosophical writing that have issued from the American press,—a fact which dispenses us *ab initio* from dwelling on its manifold excellences.

The book is made up of ten essays or addresses, which were delivered from time to time before the Philosophical Clubs of several of our American universities. Their titles are as follows: The Will to Believe; Is Life Worth Living; The Sentiment of Rationality; Reflex Action and Theism; The Dilemma of Determinism; The Moral Philosopher and the Moral Life; Great Men and their Environment; The Importance of Individuals; On some Hegelisms; What Psychical Research has Accomplished.

The first four are concerned "with defending the legitimacy of religious faith." The topic is boldly treated. Professor James has grasped the bull by the horns. There are no side thrusts or flank blows here. "I admit," he says, "that were I "addressing the Salvation Army or a miscellaneous popular crowd it would be a "misuse of opportunity to preach the liberty of believing as I have in these pages "preached it. What such audiences most need is that their faiths should be broken "up and ventilated, that the northwest wind of science should get into them and "blow their sickliness and barbarism away. But academic audiences, fed already "on science, have a very different need. Paralysis of their native capacity for faith "and timorous *abulia* in the religious field are their special forms of mental weak-"ness, brought about by the notion, carefully instilled, that there is something "called scientific evidence by waiting upon which they shall escape all danger of "shipwreck in regard to truth. But there is really no scientific or other method

"by which men can steer safely between the opposite dangers of believing too little "or of believing too much. To face such dangers is apparently our duty, and to "hit the right channel between them is the measure of our wisdom as men."

We have in these four introductory essays also a rough outline-sketch of Professor James's philosophy,—a philosophy which is outspokenly pluralistic, which is permeated with an air of blankest despair at ever finally solving the problems of the universe, which sees no criterion of certitude in either science or reality, which revels in chance and undeterminism, and soars with the loving, fluttering heart of a bird over that vast and bottomless pit where lies the "unclassified residuum." It is the "unclassified residuum" that troubles Professor James, as it has troubled many a philosopher before him; and so he has shifted the centre of gravity of philosophy from the things that we know to the things that we do not know, (and in their current formulation, never can know,) taunting us with these, and basing all his argument upon them. Objectivism he virtually discards; subjectivism is the *determining* factor of all opinion and conduct,—we had almost said of nature. Everything is feeling and sentiment, "organic needs" and "organic delights," "dead hypotheses" and "live hypotheses"; while Truth floats gloriously and majestically on, "in maiden meditation fancy free," on the trackless main of uncertainty and nowhereness. No one in the past has ever had full and perfect reasons for his beliefs; nor will any one in the future have full and perfect reasons. Such is the *mechanism* of belief. Hence the philosophical or rather practical *justification* of belief, *quâ* belief.

Here, as throughout the book, we see the *psychologist*, not the philosopher. We have the analysis of men's actions, but not their rectification, not their rationalisation. Of philosophy, however, we ask guidance towards the truth, and not a recital of the ways in which error has been committed in the past and continues to be committed in the present, with the consequent advice to go on committing errors in the same way in the future.

In fact, Professor James, despite the undeniable essential truth of his doctrine, has pressed the philosophical implications of this point too far. There *is* "absolute verity" in the world, running in a descending scale from pure logic and mathematics through the physical sciences down to ethics, religion, and sociology. Here, owing to the complication of factors, it apparently dwindles away; but it exists nevertheless. There is at the core of all these questions a skeleton of the same formal truth that sanctifies mathematics, and that promises salvation here also, when the right facts have been enlivened by it. And when through research the right facts are forthcoming, then, though the result remain a "dead hypothesis" to humanity for ages, it is nevertheless the Truth, and the men of "dead hypotheses" and the men of "live hypotheses" will disbelieve in it at their peril.

We take the following quotation from Professor James, illustrating this point:

"As a matter of fact we find ourselves believing, we hardly know how or why. "Mr. Balfour gives the name of 'authority' to all those influences, born of the in-

"tellectual climate, that make hypotheses possible or impossible for us, alive or "dead. Here in this room, we all of us believe in molecules and the conservation "of energy, in democracy and necessary progress, in Protestant Christianity and "the duty of fighting for 'the doctrine of the immortal Monroe,' all for no reasons "worthy of the name. We see into these matters with no more inner clearness, "and probably with much less, than any disbeliever in them might possess. His "unconventionality would probably have some grounds to show for its conclusions; "but for us, not insight, but the prestige of the opinions, is what makes the spark "shoot from them and light up our sleeping magazines of faith. Our reason is "quite satisfied, in nine hundred and ninety-nine cases out of every thousand of "us, if it can find a few arguments that will do to recite in case our credulity is "criticised by some one else. Our faith is faith in some one else's faith, and in "the greatest matters this is most the case. Our belief in truth itself, for instance, "that there is a truth, and that our minds and it are made for each other,—what is "it but a passionate affirmation of desire, in which our social system backs us up? "We want to have a truth; we want to believe that our experiments and studies "and discussions must put us in a continually better and better position towards it; "and on this line we agree to fight out our thinking lives. But if a pyrrhonistic "sceptic asks us *how we know* all this, can our logic find a reply? No! certainly "it cannot. It is just one volition against another,—we willing to go in for life "upon a trust or assumption which he, for his part, does not care to make."

There are a vast number of distinctions to be made here; and a vast deal of the implied argument of Professor James is unsound. I believe that the logarithm of 3 is .477123, though I have never calculated it, not because I find it so expressed in Vega's tables, but because I have in my hands the means of verifying Vega's result, and the same means that he and his predecessors employed. My faith is his faith, but merely because his faith is *reasoned* faith. I believe that the length of the mean solar year, taking Le Verrier's determination, is 365 days, 5 hours, 48 minutes, and 46 seconds, not solely because my faith is Le Verrier's faith, but because, with the proper instruments and the proper training I or any other man, can repeat Le Verrier's determination with approximately the same results. Or, to take an historical case, I do not believe that Joshua made the sun stand still because it is impossible for the sun "to stand still"; some day the sun may "stand still"; not having been in Gibeon at the time, I cannot say but that the sun did "stand still." But if the sun really did stop in its course on that historic day, I say simply that the event offered a problem for contemporary Jewish *science*, and not for contemporary Jewish *theology*.

The "uniformity of nature" is never anything more than it is; like Kant's *reine Vernunft* it is empty and marvellously elastic. When it is interrupted, we do not say that the connexion of the things of the universe is broken; we say simply a new problem has arisen which we must explain by the discovery of existing unseen factors, or by adapting our old scheme of explanation to suit the new

facts. The order of the electrical, thermal, and optical facts of the world remains unaltered, because they are never other than they are, be they what they may; and if our schemes of explaining this order have changed much in the course of three centuries, it is nothing to the discredit of the facts. When, however, we have thoroughly exhausted a province of facts, when we have set up a scheme of abstractions which *completely* covers the facts, then there can be no breach of uniformity,—an interruption in the scheme of explanation is an interruption in the scheme of nature. This is a matter of logic, an application of the principle of identity. The same facts cannot contradict one another; an interruption, a break, if it is really such, merely puts a phenomenon out of court, merely gives rise to a problem. So far as the elements of explanation and the elements to be explained are always the *same*, there our predictions, our science is supreme, and no mysticism can unthrone it. We can get no more out of a thing than we have put into it. Silk purses are not made from sows' ears. nor celestial mechanics from Joshuas. The sole elements here involved are masses, times, and spaces. These explain the motions of bodies; the motions of bodies are uniquely determined by these. By the logical law of converse, the Joshuas, and all their riotous, chaotic train, are excluded. This is not a matter of historical evidence, not a matter of faith in the uniformity of nature, but a matter of logic. $A = A$, exit Joshua! Joshua is, both in the forcible phraseology of the day and in the preordained, God-established, twin-born scheme of science and nature, the λόγος and the φύσις, not "in it."

But the Joshuas are the type of chance, chaos, and arbitrariness in all departments of research. So far have they sunken in human regard as determining elements in the sciences of mechanics, physics, and astronomy that even the most Christian and orthodox professors do not hesitate to apply the name of the great Jewish leader as a humorous appellation to their heliostats. And the time will come when even as regarding the early history of Christianity and the genetic significance of Christian doctrines the most orthodox members of the Church will be as clear as the majority of them now are regarding the significance of Joshua's achievement. This is not a matter of "organic need." The organic needs will still exist and by some will be satisfied. But they will be satisfied at their peril. There are men to-day who believe that the earth is flat and that the sun moves around it. The question whether they are satisfying their organic need is one thing, and the question of the astronomical truth of their doctrines is another. The organic needs of a savage tribe undoubtedly explain their science. The fault is not with their science; the fault is with their organic needs. Clifford was not so far wrong as Professor James believes in proclaiming it a sin to accept a belief on insufficient evidence. If his utterance on this point is to be considered merely as the expression of his organic need, it may be argued that the organic needs of men have values which vary enormously in significance. The opinion of *one* man, says Galileo, *may* be worth the belief of *ten thousand*, and the same is true of the "organic needs" of Professor James. The question is not whether Clifford's cos-

mic emotions find no use for Christian feelings, whether Huxley belabors the bishops because there is no use for sacerdotalism in his scheme of life, whether Newman goes over to Romanism because a priestly system is for him an organic need and delight, but the question is whether the conduct of each or of all these men accords with reason and consorts with the actual state of present inquiry and present truth. Newman found his reasons by the very logic which Professor James employs in his book. That it was his organic need to go over to Romanism explains his conduct, just as Professor James's organic need explains his pluralism in philosophy. But it does not *justify* his conduct. The test which must be applied has nothing to do with organic needs or personal predilections or environmental compulsion, but it is distinguished precisely by the absence of those personal needs, predilections, etc.

In principle, there is nothing new in Professor James's position. It has been a maxim of philosophy from time immemorial that "pure insight and logic" are not the only things that produce our creeds. Our conduct, says Hume, is determined by our inclinations and desires, not by our reason. The same maxim holds too in all social and political life. When princes want war, said Frederick the Great, they declare it and call in afterwards their historians and jurisconsults to give the reasons for it. But what we require of philosophy is the statement not of criteria of conduct which we know to be in the main false, but the criteria of conduct which we are certain in the main is true. People may choose between Huxley and Newman in consonance with their organic needs, but the choice is far from indifferent. If it were, the real problems of life and the world would be a hopeless chaos. Our footing would never be sure, and we should stand face to face with a hopeless, flabby, degrading, and impotent agnosticism. No one can deny that we are far nearer the solution of the great vital questions of conduct in certain directions than we were a thousand years ago, that the personality of Christ, the significance of Christian dogmas and Christian ethics take a quite different shape in our eyes than they did in those of the mediæval theologians and even of such master minds as Pascal. With the widening horizon of science and research new and grander problems will unquestionably arise, and it would be the rankest blasphemy of research and of the divinity of truth to maintain that the solution of the special questions which are engaging us to-day will never be compassed, whether they bear on science or on ethics. In the sense in which the development of knowledge generally proceeds they too will be solved, as many of them have already been solved. The Galileos and Lavoisiers of ethics and sociology will come, and when they enter joyously the bounds of Sheol with their spoils and the insignia of their conquests, they, too, will remember their Shakespeare and greet the philosophic shade of Professor James, as it sits musing on the banks of the "stream of thought," with the same words with which Henry IV. greeted the tardy Crillon after the great victory: 'Hang yourself, brave Crillon! We fought at Arques, and you were not there."

Professor James hopes to give to the world before he leaves it, a more systematic and rigorous exposition of his philosophical views. When he does so, we trust that he will supply explicit information regarding some very essential things that he has here left unsaid. When a philosopher says that such and such a thing is not explanation, that nothing that science and human ingenuity can devise is explanation, we have a right to ask of him what *he* regards as explanation, and to challenge him to give an *example* of what would satisfy *his* explanatory yearnings. If nothing can satisfy them, we shall be perfectly justified in committing them to the care of the epistemological pathologist. The same criticism is applicable to all such assertions as that "facts are opaque," that at bottom there is only "mere fact and givenness," that "of experience as a whole no account can be given," etc. To these assertions every man, whose opinions are thus impersonally assailed by a philosopher, may rightly reply: "If facts are opaque, give me an example of what you regard as translucent; if 'mere fact and givenness' is insufficient, what sort of rationality, or 'non-fact,' or 'non-givenness,' would you, just by way of instance, replace it by; if 'otherness' bothers you, what sort of a feeling would you regard as a cure of your ailment, not in order that I may supply it, but in order that I may share your joy at your discovery and escape being belabored by you for not being a companion in your misery; in fine, you have only the right to denounce my way of explaining things on condition of your indicating either positively or negatively a better way."

Such is one of the questions that a positive philosophy will seek to answer. From his position as well as his genius we have a right to expect such an attempt from Professor James. It is not by brilliant destructiveness that the highest philosophic conquests are made, but by positive acquisitions. In *The Will to Believe* Professor James has shown the Hume side of his genius; in his next work let him display the Kantian; and then the glory will be ours of having accomplished in a life-time what it took "effete" Europe a century to achieve. T. J. McCormack.

THE ORIGIN AND GROWTH OF PLATO'S LOGIC WITH AN ACCOUNT OF PLATO'S STYLE AND OF THE CHRONOLOGY OF HIS WRITINGS. By *Wincenty Lutoslawski*. Longmans.

On peut être honnête homme et faire mal des vers. One may be a very clever and learned man and write a perverse book in support of a fantastical theory. Mr. Lutoslawski is a clever and versatile man as his ability to write correctly and vigorously in four or five languages proves. His industry and gifts of rapid acquisition are sufficiently evidenced by the short time he has taken to study and extract if not to assimilate Plato and an enormous mass of technical literature about Plato. But his big book on the origin and growth of Plato's logic is a tissue of fallacious reasoning, wrought on the frame of an impossible method. This the sober critic is compelled to say despite his admiration of Mr. Lutoslawski's talent; and having said it he is bound to prove it by citation and indisputable fact.

The problem which Mr. Lutoslawski undertakes to solve is the exacter determination of the chronology of the Platonic dialogues. In a general way it is known and agreed that the *Laws* is Plato's latest work; that the minor Socratic dialogues are for the most part early; that the *Republic* occupies an intermediate position; that the *Symposium* was written soon after the year 385, and that the *Timæus* falls between the *Republic* and the *Laws*. The place of the *Parmenides*, *Sophist*, *Statesman* and *Philebus* has been much debated. Zeller still assigns them to a supposed Megarian period of Plato's development preceding the *Republic*. Of late the consensus of scholars tends to put them after the *Republic*. This conclusion is made probable by the general resemblance of style and vocabulary to the *Laws*, by a certain loss of dramatic vivacity replaced by an affected heavy elaboration of style, and by the concentration of the interest on problems of classification, dialectic and the metaphysical criticism or interpretation of the theory of ideas. The last argument, however, must not be pressed too much. The stress of attention is altered; but the problems and solutions of these metaphysical dialogues are not merely foreshadowed but distinctly suggested in the *Republic*, *Theætetus*, *Phædrus*, *Cratylus* and *Euthydemus*. This fact makes it forever impossible to base a detailed chronology of Plato's writings upon any theory of the necessary evolution of his thought. There are certain metaphysical problems which the play of primitive thought converts into vexatious logical fallacies. Plato devoted two or three dialogues to an analysis intended to dispose of these fallacies forever. This task he may have undertaken at any time after reaching his maturity. The conceptions were always present to his mind, as might be proved by citations from the *Charmides*, *Lysis*, *Euthydemus*, and *Republic*. To determine dogmatically the time he selected for working them out in their most explicit form we must look for other evidence. This evidence Mr. Lutoslawski finds in the statistics of style interpreted by what he calls the science of stylometry. Tabulating with laudable industry the observations found in some thirty or forty miscellaneous studies of Plato's style, which he accepts without verification, he establishes a list of some five hundred stylistic peculiarities including such features as the use of a particular rare or technical word, the preference for this or that type of adverbial phrase or interrogatory formula, the frequency of some particular word formation, or the use of a philosophic term in some special sense. The *Laws* being the latest of Plato's writings the relative dates of other presumably late works may be roughly determined by the percentage to the page of the peculiarities which they have in common with it. This latest group, the *Sophist*, *Politicus*, *Philebus*, *Timæus*, *Critias*, and *Laws* may be similarly used as a standard of comparison for all other dialogues.

In the application of this method Mr. Lutoslawski displays great ingenuity. He distinguishes accidental, repeated, important and very important peculiarities. A very important peculiarity scores four accidental peculiarities, an important peculiarity three. In this way a coefficient of chronological affinity is worked out to two places of decimals for every important dialogue. The *Laws* is credited with

718 units of peculiarity of the later style. The *Apology* with only 16 units has a relative affinity of 0.02. The *Phædo* with 0.21 is later than the *Symposium* with 0.14.

There is not much profit in debating this method with Mr. Lutoslawkski. We may grant his general contention that it is ideally possible for "science" or rather omniscience to determine the dates of a series of writings by this method and yet remain sceptical of his ability to prove in this way that the *Symposium* necessarily preceded the *Phædo*. Mr. Lutoslawski accepts his facts in the lump from previous investigators. Some experience with Platonic "literature" moves me to say that I should hesitate to base the slightest inference on any amount of such "facts" without independent verification.

The evidential value of a stylistic "peculiarity" may depend wholly on the question of the dependence of style on subject matter, and who is to estimate that? Take for example the feature of "apodictic" answers,—answers that express a strong assent. Of what value are statistics that ignore the fact that such answers will be most frequent where Socrates is arguing with a friendly or consenting interlocutor? And more generally, what confidence can we place in the entire method before it has been tested in detail on some body of writings whose dates are known, but not known to the experimenter, and before in this way some definite canons of psychological probability in the matter have been established?

From this elusive subject then I gladly turn to the second and larger division of the book in which our author endeavors to confirm the results of the stylometric method by tracing the necessary order of development of Plato's logic. Here again it is impossible to join issue on the general proposition.

It is *a priori* possible that Plato's philosophy and more particularly his perception of elementary logical principles were in a continuous state of development and transformation throughout his fifty years of intellectual life. It is psychologically conceivable that, as Mr. Lutoslawski affirms, he at first regarded the ideas only as Socratic general notions, then hypostatised the idea of beauty alone in the *Symposium*, elevated this hypostasis in the *Phædo* to ethical and mathematical ideas and even to ideas of manufactured objects in the *Republic*, and then in the *Theætetus* and *Parmenides* abandoned this doctrine for the view that the ideas are merely the concepts of a mind. But it is also possible that Plato's thought was fixed in its main outlines before he reached the age of forty, and that he habitually throughout his writings treats all general concepts as transcendental ideas whenever it suits the theme, the rhetoric, or the mood of the hour. The second view I believe to be correct, because I find no passages in Plato inconsistent with it. The former I deem erroneous, because those who maintain it are always driven to foist upon Plato distinctions not found in his text, and almost invariably garble and mistranslate their quotations in excess of the measure permissible to human fallibility. Here we enter upon the domain of verifiable facts. In order to prove that in the *Timæus* the ideas are nothing else than God's thoughts, Mr. Lutoslawski translates

νοήσει μετὰ λόγου περιληπτόν, "which exist in reason" (p. 474), or "included in thought" (p. 477). It means, of course, apprehended by pure reason in contradistinction to sense. On page 403 the drift of the argument in *Parmenides*, 132 C, is utterly misapprehended, the quotation is garbled, and the answer of Socrates, misquoted, is pieced on to a portion of the question of Parmenides, to whom the whole is attributed. On page 288, ἐν τῷ εἴδει, *Rep.* 402 C, meaning "in the body," is interpreted "in ideas." On page 329 the severity of the *Republic* is contrasted with the leniency of the *Phædo* on the ground that according to the latter the murderer of his father might be pardoned after a year. It is the man who strikes his father. On page 383, *Theætetus*, 155 A, B, is grossly misinterpreted. Socrates merely says of certain contradictory beliefs that they contend with one another in us,—in our souls. This is interpreted: "The axioms are here said to be *in the soul*, whereby it becomes clear that we are no longer dealing with transcendental ideas as in the *Phædo*, but with subjective notions." The theory of ideas is obviously not in question at all. On page 464 a sentence from *Philebus*, 13 A, is utterly misrepresented. The Greek means: don't trust this (fallacious) argument that blends in undiscriminating unity the most opposite things." Our author's interpretation is: "We must not attempt a reconciliation of all contradictions."

Mistakes of this character, though easier to detect and demonstrate, are as nothing compared with the false points, mistaken inferences, irrelevant parallels, unwarranted distinctions and arbitrary assertions that abound throughout the work. I will venture a few illustrations in spite of the lack of space to support them by argument. On page 201, *Crito*, 47 A, is cited to show that in the earlier dialogues Plato estimates a judgment according to its moral value without postulating an intellectual standard of truth. The point is a false one as the entire context shows. On the very next page, 48 A, Plato speaks of the "truth in itself" in the same connexion. On page 206, *Protagoras*, 356 E, is wrested from its proper application. On page 210, *Euthydemus*, 289 B, is utterly misconceived in the paraphrase: "Plato is so proud of his acquired certainty of knowledge that he would not give it up even for immortality," etc. On page 211 it is sheer nonsense to say that the hypothetical method taught in the *Meno* is employed in *Euthydemus*, 284 A and 287 E. On page 213 three citations are slightly garbled or docked. On page 232, *Gorgias*, 461 E, is quoted to illustrate the narrowness of Plato's earlier patriotism as compared with the more cosmopolitan tone of later writings. The words are ironical. But the point is a false one anyway. On page 229, *Cratylus*, 433 E, and *Politicus*, 261 E, have nothing to do with each other. Page 239, the new meaning of philosophy, "first explained in the *Symposium*," is explicitly stated in *Lysis*, 218 A. Indeed, all the points made on the changes in the meaning of "philosophy" and "dialectic" throughout the book are false ones. Page 250, Plato does not affirm in *Phædo*, 82 C, that the philosopher becomes equal to the gods, but that he goes to dwell with them. On page 284 the stress laid on the peculiar position of justice in the republic is fallacious. Plato or any Greek who had read

Theognis, 147, at school could at any time make justice the virtue *par excellence*. Cf. *Gorgias*, 477 C and 527 B. On page 317, *Republic*, 602 D, is quoted as a distinct advance on the thought of the *Phædo*. But the passage is almost identical with *Protag.*, 356 D, which our author thinks earlier than the *Phædo*. Page 373, the innocent phrase, *Theætetus*, 184 C, D, "soul or whatever we must call it," is pressed to this result: "In earlier work Plato used the term soul as free from every ambiguity. Here we see already a trace of doubts about the existence of the soul," etc. A comparison of *Crito*, 48 A, and *Symposium*, 218 A, will show that the phrase is a harmless literary flourish.

Obviously this sort of thing is endless. There is no limit to the false points that can be made about a subtle dramatic writer like Plato by means of irrelevant parallels, confident assertions that this or that idea occurs for the first time in such or such a place, and exaggeration of the significance of casual phrases in disregard of the total context. The illustrations here given are not one fourth of those noted. I do not wish to seem discourteous. Mr. Lutoslawski's book, as I said in the beginning, shows him to be a very clever man. There is room for interminable debate as to the value of his general method and his conception of Plato's development. But his reasoning from page to page is a series of fallacies resting on misapprehensions of the fair meaning of the text and context of his author. That is a fact. And a critic surely should be permitted to state facts.

PAUL SHOREY.

LA STRUCTURE DU PROTOPLASMA ET LES THÉORIES SUR L'HÉRÉDITÉ. By *Yves Delage*, Professeur à la Sorbonne. Paris: C. Reinwald & Co. (Schleicher Frères). Pp., xiv+878.

As all roads lead to Rome, so do the current problems of biology find their focus in the problem of the cell. The present volume embodies the most important results which have been reached by the eager and almost feverish researches of the last decade upon the structure and physiology of the ultimate optical unit of living matter.

Professor Delage devotes some most interesting pages to a statement of the reasons that induced him to undertake his laborious task. From the point of view of method he would distinguish four great periods in zoölogy: the first period being typified in the studies of the external form and markings of organisms, undertaken by such workers as Aristotle, Linné, and Buffon, and extending into the early part of the present century. The second period is distinguished by the recognition of the necessity for delving deeper into the recesses of the organism; many observers had felt this need, but Cuvier was the first to stamp dissection as a real method of investigation and to carry it out to its logical consequences. The impulse given by Cuvier lasted for half a century and has not yet spent its force. A third period, however, may be said to have begun with the establishment of marine laboratories, which introduced a different method of work as important as those that had gone before and

gave birth to the new and absorbing science of embryology. The fourth period, likewise, may be said to be characterised by a new method, the extension and elaboration of histological technique, which in its turn made possible for the first time an accurate study of the cell. It is thus that our author paves the way for an indictment of certain tendencies in modern biology, which is certainly full of discretion as well as truth. Professor Delage sees that some of his fellow-workers are still stranded on the shallows of the old methods, while the main current of biological research is sweeping by into wider and deeper channels. To illustrate his point, he gives a leaf out of his own experience. "I made my début in the natural sci-"ences by a monograph upon the circulatory system of the edriophthalmous crus-"taceans. I expended much time and some skill in injecting a number of these "animals. And with what result? The knowledge that the heart has such a form "and such dimensions, that it sends so many arteries forward (four or five more "than was supposed), and so many back, the existence of which was not previously "suspected, and that there exists in front of the nervous system a remarkable ves-"sel that was not known before.

"Of what value is this? In what respect has it enlarged or modified our con-"ception of the crustacean or of the circulatory function? The really important "fact was made known long before by Milne Edwards when he showed that the "blood came to the heart from the gills, was launched by the heart into the arter-"ies which conduct it to the organs of the body, and that it passes finally into the "general body cavity and into lacunæ by which it finds its way to the respiratory "apparatus. Beyond this what does it matter that such a one of the mouth-parts "receives its artery from such a point of the aorta or some one of the branches? "We have not to make surgical operations upon these animals."

This all has a singularly familiar ring and may perhaps serve to stir other than French biologists to a sense of some sort of distinction between the essential and the non-essential. Professor Delage takes the broad view that it is our present task to attack the great problem of general biology, not in a general final assault but by a slow and patient yet sure approach. "One should no longer content one-"self, as so many do to-day, with dissecting, staining, sectioning, drawing whatever "happens to be not yet dissected, stained, sectioned, or drawn. All these things "must be done no longer to fill a minute lacuna in our anatomical or histological "knowledge, but to solve some biological problem however small." It is the *decisive experiment* or *decisive observation* for which we should strive.

The point of view of the work will be easily inferred from these extracts. The book itself is divided into four parts: The Available Data (about one-third of the volume), Special Theories, General Theories, and the author's own conclusions and summing-up. Nowhere else will be found a clearer or more interesting portrayal of the present situation of biological investigation. The burning questions of heredity, variation, and sex, and the special themes of regeneration, cellular division, the rôle of the nucleus, and the significance of the centrosome, are here dis-

cussed with a lucidity and a wealth of illustration and reference which should aid in stimulating research and in diverting the industry and zeal of many workers into lines of activity where every stroke will count and every new fact will mean some real progress.

There are a few simple figures and diagrams in the text, the scope of the vollume apparently forbidding very copious illustration. A comprehensive bibliography is appended to the volume, and there is an index more adequate than is frequently the case in books of this sort. The press work is admirable.

UNIVERSITY OF CHICAGO. EDWIN O. JORDAN.

THE EVOLUTION OF THE IDEA OF GOD: AN INQUIRY INTO THE ORIGINS OF RELIGION. By *Grant Allen*. New York: Henry Holt and Company. 1897. Pages ix, 447.

Whatever may be the ultimate position assigned to Mr. Grant Allen's work, there can be no doubt that in many respects it is a remarkable production. It must be so accounted if for no other reason than that its whole argument is based on the conception of the continued life of the dead, a conception which is substituted for the animism which since its formulation by Dr. E. B. Tylor has become accepted almost universally as expressing the general idea entertained by primitive man in relation to the observed activities of nature. Of course Mr. Allen is not the first to make that change, or rather to recognise the important rôle to be assigned to the spirits of dead men in primitive belief. This was done particularly by Mr. Herbert Spencer; and in my own *Evolution of Morality* the same ground was taken, as it was later by Mr. J. G. Frazer in his very able work *The Golden Bough* to which the author of the present volume expresses his deep obligations. Mr. Allen regards his work as a reconciliation between the schools of humanists and animists headed respectively by Mr. Spencer and Mr. Frazer, with a leaning towards the former, but at the same time as giving an original synthesis of the subject. It must be supposed, therefore, to have considerable novelty and if half the claims made for it in this respect be well founded, Mr. Allen's work will justify itself, whatever may be the fate of its main conclusion.

In his Preface, the author furnishes a list of the views which he considers novel, and as it gives a good idea of the contents of his work, its chief features may be reproduced here. He refers to two points especially as new: the complete demarcation of religion, as practice or worship, from mythology, and "the important share assigned in the genesis of most existing religious systems to the deliberate manufacture of gods by killing." This is one of the cardinal notions of the book a large portion of which is assigned to its development. Among its other novel ideas, Mr. Allen enumerates the following: "the establishment of three successive stages in the conception of the life of the dead, which might be summed up as corpse-worship, ghost-worship, and shade-worship, and which answer to the three stages of preservation or mummification, burial, and cremation; . . . the entirely new

conception of the development of monotheism among the Jews from the exclusive cult of the jealous God; the hypothesis of the origin of cultivation from tumulus-offerings, and its connexion with the growth of gods of cultivation; the wide expansion given to the ancient notion of the divine-human victim; . . . the suggested evolution of the god-eating sacraments of lower religions from the cannibal practice of honorifically eating one's dead relations; and the evidence of the wide survival of primitive corpse-worship down to our own times in civilised Europe."

This is an imposing array of conclusions and it must be admitted that Mr. Allen has supplied strong evidence in support of them. They all have a distinct bearing on the evolution of the idea of God, which is the subject of the work, and particularly has the survival of corpse-worship which the author regards as the starting-point of such evolution. Nearly all the other matters referred to have a relation, direct or indirect, to this fact, and when combined with the deliberate manufacture of gods by killing which, as we have seen, is one of Mr. Allen's cardinal notions, corpse-worship furnishes the key to his theory of the evolution of the God idea. Of course, the corpse which is regarded as sacred carries with it the notion of the spirit of the dead man as still living, and in more or less intimate association with the body or its remains. There is no difficulty in establishing the general belief in such a connexion, which accounts, as the author points out, for the care with which the head or skull of a dead person is often preserved. Mr. Allen argues ingeniously that burial and cremation had their origin in the endeavor to get rid of the presence of the spirits of the dead; with little practical result, however, as first ghost-worship and then shade-worship was substituted for corpse-worship, the difference being one of refinement of spirit existence, not change of spirit nature. By worship is meant the ceremonial offering of food or other things to the spirit or god, which is at first a satisfaction of the wants of the dead to prevent them from injuring the living, but afterwards becomes developed into the sacrifice intended to insure the active interference of the deity on behalf of his followers.

Ancestral-spirit worship may be regarded as the natural process; but mankind was not satisfied with the gods thus obtained, and set about the manufacture of artificial gods. The former may be regarded as the family or tribal gods, and they would suffice so long as the wants of their descendants and their mode of existence continued the same. That the "manufacture of gods by killing" originated in changes such as attend progress in civilisation would seem to be required by the nature of the artificial gods. One class of these consists of foundation-gods, that is the spirits of human beings who have been buried beneath a building to give firmness to its foundations. It has been usual to ascribe this practice to a desire to appease the earth-demons, but it can hardly be doubted that the intention was, as Mr. Allen insists, that the spirits should become actual guardians of the place where they were buried. The practice belongs to what Mr. Speth terms "builders rites and ceremonies," and it is marvellous how tenacious it has been. It is not surprising that the barbarous custom has survived to the present day among uncul-

tured peoples, but it appears to have not been unknown in Europe down to five hundred years ago, especially in connexion with city walls and gateways. The other great class of artificial gods consists of the "gods of cultivation." Mr. Allen thinks that cultivation of the soil began in the unconscious sowing of seed upon the newly turned ground of a burial plat or barrow. Among other food offerings at a grave would be seeds, some of which would take root and produce a crop of grain, which a savage would presume came from the spirit of the dead, who, "pleased with the gifts of meat and seeds offered to him, had repaid those gifts in kind by returning grain for grain a hundredfold out of his own body." This view of the origin of cultivation of the soil is as rational as any other that has been proposed, and it is supported by the fact that many peoples of varying degrees of culture have been accustomed to sacrifice human victims "whose bodies are buried in the field with the seed of corn or other bread-stuffs," and sometimes a portion of the victim's blood was mixed with the grain in order to fertilise it. The story of the Meriah sacrifice of the Khonds of Orissa has become almost classic, although it is paralleled by reference to the customs of other peoples, particularly the ancient Mexicans. Mr. Allen remarks on the fact that an expiatory value attached to the Meriah sacrifice. The death of the victim was supposed to ensure not only good crops but also immunity from all disease and accident.

Mr. Allen believes the Christian legend to have been mainly constructed out of the details of the early god-making sacrifices, and as the establishment of this point would seem to be the chief aim of his laborious work, this notice may well be concluded by some reference to that subject, and to the bearing of the facts collected by him on the evolution of the general idea of God. Now there can be no doubt that the Christian legend reproduces very closely in many of its details the incidents which accompany the artificial production of the corn-gods and of the wine-gods, of whom Dionysus is a type of earlier paganism. The sacrament in which the body of Christ is eaten in the form of bread and his blood is drank as wine is such an identification. Christ was recognised as God and man like the earlier deities, and he is regarded as the son of, and in a sense one with, the older ethnical deity, and thus "he is offered up, himself to himself, in expiation of the sin committed by men against divine justice." He voluntarily submits to death, and is also bought with a price, as with the Meriah of the Khonds and similar victims. There is a curious analogy throughout the whole subsequent procedure. "The sacred victim is cruelly scourged that his tears may flow. . . . The episode where Herod and his men of war array the Christ in a gorgeous robe is the equivalent of the episode of the Mexican king arraying the god-victim in royal dress, and is also paralleled in numerous other like dramas elsewhere. The women who prepare spices and ointments for the body recall the Adonis rites; Pilate washing his hands of the guilt of condemnation recalls the frequent episode of the slaughterers of the god laying the blame upon others, or casting it on the knife, or crying out, 'We bought you with a price; we are guiltless.'" There is nothing improbable in

all this, seeing that, as Mr. Allen points out, Christianity united in itself all the most vital elements of the religions then current, and all the old religious ideas crystallised around the person of its founder. In the doctrine of the bodily resurrection of Jesus, which is the central idea of Christian teaching, we have a phase of the primitive belief on which corpse-worship is based. The dignity assigned to Christ after his ascension followed naturally from his relationship to Jahveh, who from being the local deity of the Israelites became the Supreme God of the Universe. Mr. Allen explains the steps by which the change took place, and there is no more difficulty in connexion with the process than in the notion of a tribal chief becoming the head of a world-wide empire, especially as it is accompanied by association of the spirit of the dead with the solar body.

There are two aspects of the religious question which require fuller treatment than Mr. Allen has accorded them. The ideas entertained by a people in relation to the deity having developed in the human mind, the general idea of God is thus a kind of mental reflexion, and the genesis of this idea has yet to be definitely traced, although much has been done by Professor Tiele and other writers in this respect. The ethical side of religious development also requires much more consideration, and although Mr. Allen purposely abstains from considering the ethical aspect it is by no means clear that he is justified in doing so, if he wishes to make his treatment of the evolution of the idea of God complete. There is much evidence to show that the supposed desire or will of a deceased chief, that is a human god, is regarded as requiring obedience. If such be the case, worship and offerings are only one aspect of religion, its other aspect being ethical. The moral ideas we ascribe to God are as much a reflexion from our own minds as are the ideas we entertain as to his being.

C. STANILAND WAKE.

THE NON-RELIGION OF THE FUTURE. A SOCIOLOGICAL STUDY. Translated from the French of *M. Guyau*. New York: Henry Holt and Company. 1897. Pages, xi, 543. Price, $3.00.

As pointed out by the author, M. Guyau's present work is intimately related to his earlier ones treating of æsthetics and morals. Beauty, according to his definition, is "perception or an act that stimulates life simultaneously on its three sides—sensibility, intelligence, will—and that produces pleasure by the immediate consciousness of this general stimulation." Hence the æsthetic sentiment is identical with self-conscious life, that is with the life which is conscious of its own subjective intensity and harmony. On the other hand, M. Guyau supposes the moral sentiment to be identical with "a consciousness of the powers and possibilities in the sphere of practice of a life ideal in intensity and breadth of interest," such possibilities relating chiefly to one's power of serving other people. When this consciousness of the social aspect of life is extended so as to embrace the totality of conscious beings, "not only of real and living, but also of possible and ideal beings," the religious sentiment appears. Thus, the essential unity of æsthetics with morals

and religion is to be found in the very notion of life, and of its individual or social manifestations.

The first portion of the present work, which deals with the religious sentiment, is devoted to the origin and evolution of what the author terms *sociological mythology*. The meaning attached to this phrase may be made clear by the author's statement, that religion consists essentially in the establishment of a bond, at first mythical and subsequently mystic, between man and the forces of the universe primitively, afterwards between man and the universe itself, and finally between man and the elements of the universe. Thus religion is regarded as "an imaginative extension, a universalisation of all the good or evil relations which exist among conscious beings, of war and peace, friendship and enmity, obedience and rebellion, protection and authority, submission, fear, respect, devotion, love: . . . a universal *sociomorphism*." M. Guyau condenses his theory into the definition of religion as a universal sociological hypothesis, which endeavors to explain all things by analogies drawn from human society, "imaginatively and symbolically considered." He accepts neither Max Müller's henotheism, with its vague idea of the infinite, nor Von Hartmann's monistic pantheism, both being of modern origin. The religious instinct of M. Renan is equally rejected as being unknown to primitive man, whose only instincts are those of self-preservation and sociability. That which M. Guyau places at the antipodes of Max Müller's theory, the spiritism of Mr. Herbert Spencer, he regards as sufficient to explain the ancestor-worship of primitive peoples, but not the "cult for the gods." The common idea which dominates both these forms of worship we find in "a natural persuasion that nothing is absolutely and definitely inanimate, that everything lives and possesses, therefore, intentions and volitions." Animals and savages, as young children among civilised peoples, look upon nature as a society, and they interpret every movement in nature as caused by desire. This *panthelism*—a term which M. Guyau proposes, in the place of fetishism, to express that primitive phase of human intelligence—represents an earlier stage of belief than the *animism* of Dr. E. B. Tylor. With the former the world is a society of living *bodies*, while with the latter the conception is of distinct souls animating each its own body, which it is capable of quitting. Animism was at one time universal, but "it immediately succeeded fetishism or concrete naturism, the primitive belief, in which animating soul and animated body were not distinguished."

The development of theism from animism M. Guyau regards as inherently necessary. When spirits are capable of separating themselves from the body, and of performing actions mysterious to us, they begin to be divine. Such beings are clairvoyant, however, as well as powerful, and are also either benevolent or hostile. Here we have the germ of the theory of Divine Providence, which later appears as the notion of a general, directing intelligence. By the growth of experience, man gradually forms the conception of an orderly subordination among the different voluntary beings with whom he peoples the earth, a kind of "unification of special

providences," and now "he conceives the world as dependent upon the will of some one or more superior beings who direct it, or suspend at need the ordinary course of things." M. Guyau by no means condemns the belief of primitive man in a Providence and in miracles which accompanies it. When man lives in the supernatural, there exists a sentiment of evil, suffering, and terror, to correct which the believer takes refuge in miracles, and "Providence is thus the primitive means of progress, and man's first hope." Nor are miracles to be regarded as frauds. They may be illusions which science is beginning to explain, or phenomena of the nervous system, and in most cases have a foundation in fact.

The most important feature of the evolution of religion is the development of its sociological and moral aspects. There can be no doubt that originally religion and morals were not related. Wickedness as well as goodness was attributed to the gods, who became divided into two classes recognised respectively as virtuous and wicked. Finally, however, the principle of goodness established its superiority under the name of God, who became "the personification of the moral law and the moral sanction, the sovereign legislator and judge, in a word, the living law of universal society, as a king is the living law in a human society." The worship of God assumes certain fixed forms which are considered essential, and their establishment as rites necessitates a priesthood, which tends to become hereditary and its members sacred. The outward cult is attended with subjective worship, the highest form of which is love to God. This under the influence of mysticism may become a perversion, as M. Guyau considers the worship of Christ to be to a considerable extent. But the love of God contains a moral element, which ultimately transforms it into a moral love, that is, the love of virtue, which expresses itself in good works and the externals of religious worship.

The second part of M. Guyau's work is devoted to a consideration of the dissolution of religions in existing societies, beginning with an examination of the nature of dogmatic faith and its particular dogmas, with especial reference to orthodox Protestantism; the conclusion being that under the influence of science, public instruction, and other agencies, the dissolution of dogmatic faith is inevitable Such will be the fate also of the symbolic faith which is gradually taking the place of dogmatic faith, especially in Protestant countries under the influence of the teaching of such books as Matthew Arnold's *Literature and Dogma*. M. Guyau's opinion is that religious faith will finally be replaced by moral faith, religion being thus absorbed into morality. Such will be the fate also of the religious morality based upon dogma and faith. The only durable elements of religious morality are respect and love, but love of a personal God will be replaced by love of humanity, which is, however, that of God himself as ideal. This love of the ideal harmonised with the love of humanity will realise itself in action, and religion "having become the purest of all things—pure love of the ideal—will at the same time have become the realest and in appearance the humblest of all things—labor." The remainder of Part II. discusses many practical questions connected with religion. Referring

to the notion that woman is naturally prone to superstition, being governed by sentiment rather than reason, M. Guyau remarks that this is due to the restriction of woman's activity, and he affirms that as her sphere of action is enlarged woman's tendency to mystic impulses and to exercises of piety will be lessened. He has some happy thoughts on the origin and nature of modesty and also of love, which together constitute the strength of woman's disposition to propriety. Much of what M. Guyau says in relation to the religion of woman has reference more particularly to France, and such is the case also with his discussion of the effect of religion and non-religion on population and the future of the race. He considers the problem of population in France and the operation of Malthusianism, which he regards as a worse scourge than pauperism, and he suggests a number of remedies for the sterility which has caused so serious a decrease in the birth-rate. He looks to science to do in the future what religion has done in the past, to secure "the fertility of the race and its physical, moral, and economical education."

What has gone before may be considered as the prelude to the real subject of M. Guyau's exhaustive work—that which gives title to the book itself—the Non-religion of the Future. The author in his Introduction explains why he adopted this title. He states that in many books the "religion of the future" is merely a hypocritical compromise with some form of positive religion, and that he adopted what he regards as the less misleading term "Non-religion of the Future" in opposition to that form of subterfuge. And yet the term is undoubtedly misleading to those accustomed to the English language. M. Guyau remarks that "to be non-religious or a-religious is not to be anti-religious. The non-religion of the future may well preserve all that is pure in the religious sentiment: an admiration for the cosmos and for the infinite powers which are there displayed; a search for an ideal not only individual but social, and even cosmic, which shall overpass the limits of actual reality." He adds that the absence of positive and dogmatic religion is the very form toward which all particular religions tend. Moreover, the developments of religion and those of civilisation have always proceeded hand in hand; "the developments of religion have always proceeded in the line of a greater independence of spirit, of a less literal and less narrow dogmatism, of a freer speculation. Non-religion, as we here understand it, may be considered as a higher degree simply of religion and of civilisation." The distinction here made is strictly that between religion and theology, which has long been insisted on by liberal English writers, and hence M. Guyau's non-religion is in reality religion freed from its dogmatic and supernatural associations. What he enforces is the destruction of dogma and the substitution for it of metaphysical hypothesis, by which is meant speculation having for its aim the solution of the great problem of the origin and destiny of the universe. M. Guyau devotes three chapters to a consideration of the principal metaphysical hypotheses which will replace dogma. These he treats under the heads of Theism, Pantheism—under its optimistic and pessimistic phases—Idealism, Materialism, and Monism. Monism regards matter and mind as two aspects

of one and the same thing, and these two aspects are synthesised as *life*, which is the fundamental conception of philosophy. Life is productivity, and the individual, by the mere fact of growth, tends to become both social and moral. Thus, "to live is to become a conscious, a moral, and ultimately a philosophical being." Hence it is not surprising that M. Guyau finds the highest possible conception in the realm of morals,—that of "a sort of sacred league between the higher beings of the earth and even of the universe, for the advancement of what is good." The great charm of metaphysical hypotheses now is that they give a moral significance to the world, conformable to our own conscience as affectionate and social beings.

This gives us the law, in which the future history of religion may be summed up, "that religious dogmas, transformed at first into simple metaphysical conjectures, reduced later to a certain number of definite hypotheses, among which the individual made his choice on increasingly rational grounds, ultimately came to bear principally on the problem of morals." Thus religious metaphysics will finally result "in a transcendental theory of universality, an ideal sociology embracing in its sweep all the beings that constitute the universe; and this sociology will be founded, not upon physical inductions, like that of the earliest religions, nor upon ontological inductions like that of the first system of metaphysics, but upon the moral conscience of mankind. Animism, theism, pantheism, are destined to fall under the domination of what may be called moralism." Monism is not here included, and, indeed, M. Guyau expressly states elsewhere that he does not purpose to pass judgment upon the pretensions of monism as a system of metaphysics, although the trend of modern thought is towards this system, which is that of evolution. In connexion with it, however, he treats of what is the most interesting part of his subject, the destiny of the human race and the hypothesis of immortality. He regards as the most discouraging aspect of the theory of evolution, the dissolution which appears to be inevitably bound up with it. But the future may not be like the past, as the resources of nature are inexhaustible, and "the conception of an ideal presupposes the existence of a more or less imperfect realisation of it." This hope M. Guyau applies to the future of man, whose immortality he believes to be possible, under the condition of the evolution of life under a superior form. Such immortality may be impersonal, but, on the other hand, it is possible "that what makes individuality limited is not of the essence of personality, of consciousness; perhaps what is best in thought and will may become universal, without ceasing in the best sense to be personal like the Νοῦς of Anaxagoras." The author supposes that within the sphere of consciousness there exists a series of concentric circles "which lie closer and closer about an unfathomable centre, personality." The impersonal immortality of our actions is unquestionable, and this alone is allowed by science. But science is opposed by affection, which protests against death, and thus we have two great opposing forces. Everywhere science is inclined "to sacrifice the individual in the name of natural evolution; love is inclined, in the name of a higher moral and social evolution, to preserve the individual." M.

Guyau finds support for the latter contention in the fact that continuity of existence means continuity of function, and he supposes that, as individual consciousness is a compound of the consciousness of all the cells that are united in the physical organism, thus constituting the individual a society, so the consciousness of different individuals may be able to interpenetrate and thus communicate to each other a new sort of durability, the individual consciousness surviving as a constituent part in a more comprehensive consciousness. According to this view, immortality may be "an ultimate possession acquired by the species, as a whole, for the benefit of all its members." M. Guyau thinks that as the basis of consciousness is inaccessible to science, a still more literal immortality is possible, but he admits that it is all pure speculation, and for him who sees death in "all its brutality," he counsels the resignation of Stoicism, and offers the consolation that "the portion of the immortal patrimony of the human race, which has been entrusted to him and constitutes what is best in him, will endure and increase, and be passed on, without loss, to succeeding generations." We have not space to consider what is to be the future of the practical side of the religious spirit, beyond the bare statement that associations will be formed for intellectual, moral, and æsthetic purposes and that to the worship of the memory of the dead will be added the worship of nature, which will be the true temple of the future. We must now leave M. Guyau's remarkable work, which to wide erudition adds profound thought and which criticises the beliefs and practices that have developed with the growth of mankind in the most charitable spirit and in language so clear and precise that "he who runs may read and understand."

C. STANILAND WAKE.

A MANUAL OF ETHICS. By *John S. Mackenzie, M. A.*, Professor of Logic and Philosophy in the University College of South Wales and Monmouthshire. Third edition. Revised, enlarged, and in part rewritten. University Correspondence College Press. London: W. B. Clive; New York: Hinds & Noble. 1897. Pages, xvi+456. Price, $1.50.

The favorable reception accorded Professor Mackenzie's *Manual of Ethics* by the class of readers to which it is particularly addressed, may be taken as evidence not only that it supplies a widely-felt want, but that its views recommend themselves to those who are in search of the best thought on the ethical subject. It is not surprising that the book has reached a third edition, which will be welcome, as it enables the author, by the alteration of certain passages and the addition of fresh matter, to remove the impression which had been formed by some persons, that he had given too little weight to ethics as a subject of actual experience in the relations of social life. Like every other form of mental activity, the ethical has a double aspect: one subjective and the other objective, these appearing respectively as Character and Conduct. Professor Mackenzie defines Ethics as the Science of the Ideal in Conduct, and yet, as he points out, the Greek word ἦθος means *character*. This forms the real basis of conduct, which thus stands towards character in much

the same relation as that which function has towards structure or organic disposition. When psychology has been assigned to its proper position, it may be found, indeed, that organic and psychical disposition are practically one and the same thing. This would give Ethics a physiological basis, but Professor Mackenzie, in accordance with the teaching of the school of Idealism whose views he adopts, begins his discussion with a consideration of the strictly psychological aspects of Ethics. Thus he deals with the subject of desire and will and with the nature of conscience and of the moral judgment. Desire is distinguished from appetite in that the former alone implies a definite point of view. Men's desires depend on what they like, and what they like is, as insisted by Mr. Ruskin, an exact expression of what they are. A person's desires thus form the "universe" of his character, as this presents itself at the time at which any particular desire is felt. With reference to the conflict of desires, the author points out that a desire will conquer, not because it is the stronger, but because it forms part of a stronger universe. Even this is not an adequate statement of the case, for with most actual human beings, "what we have is not so much any one universe that decidedly predominates, as a number of universes that stand to one another in certain definite relations," the differences of relation constituting differences of character.

Professor Mackenzie affirms that the question how it comes about that one set of relations predominates at one time and not at another belongs to Psychology rather than to Ethics. It must not be lost sight of, however, that Ethics correspond to what in the theoretical division of the mind is called the Will, and therefore cannot be entirely separated from Psychology at any point. The development of the moral judgment in relation to conduct has been largely due to the action of society on the individual, whose conduct in relation to society constitutes what is called applied ethics; but that may be said with equal truth of intellectual development as a whole. This must be distinguished from the development of the rational faculty the action of which on the other mental factors gives rise to the consciousness of self or self-consciousness that is characteristic of the human mind. Professor Mackenzie of course adopts the theory of Ethics, formulated by Green, which is based on the fact that man possesses a rational principle. The rational self is the true self, and this is "the universe that we occupy in our moments of deepest wisdom and insight." The rational principle is supposed by Green to be *implicit* in nature but *explicit* in man, or at least becoming so. The significance of the moral life consists in the continual endeavor to make the rational principle more and more explicit,—"to bring out more and more completely our rational, self-conscious, spiritual nature." This statement is especially true of what may be regarded as the historical period of man's existence on the earth, but it must be applicable also to man under the most primitive conditions. There cannot have been any breach of continuity in moral progress, and although this has proceeded in later ages by accelerated steps, it must always have taken place.

Moral improvement has kept pace with intellectual development, or rather

with that of the rational faculty. The remarkable influence which the customary law of barbarous peoples has over the conduct of individuals arises from the fact that "law," written or unwritten, is recognised as the expression of reason, having for its view the social welfare. Here we have the real basis of the "social imperative," for although, as Mr. Herbert Spencer remarks, "we must consider the ideal man as existing in the ideal social state," the ideal itself is merely an expression of the rational principle, which is ever reaching higher and higher and exhibiting its influence in what is known as moral progress. The ideal has, nevertheless, an æsthetic element, as the emotional nature forms the real basis of all conduct. It constitutes the character, and it is through its action on the character that the rational principle affects moral conduct.

Professor Mackenzie's excellent book is not meant to be exhaustive, and yet it touches on every aspect of the ethical question, discussing the several theories of the moral standard that have been formed, and dealing at length with the application of ethical principles to the practical life. In his last chapter the author treats shortly of the metaphysical or religious relations of Ethics, affirming in its final sentence that "Ethics, regarded as a separate science, is not complete in itself," a conclusion which, although somewhat tautologically expressed, is required by the general argument of his work. One of its most valuable features is the reference throughout to other works treating of the various branches of its subject, and it is interesting to note that not a few of these are by American writers. C. S. W.

A Study of Ethical Principles. By *James Seth*, M. A., Sage Professor of Moral Philosophy in Cornell University. Third edition, revised and enlarged. Edinburgh and London: William Blackwood and Sons. 1898. Pages, xvi, 470.

The present edition of Professor Seth's able work contains some notable additions. A chapter on "The Methods of Ethics" is intended to explain the author's changed opinion as to the limits of the science which, as belonging to the type of sciences which seeks to organise into a rational system "the chaotic mass of our Ought-judgments," he now regards as normative or appreciative, although as embracing the investigation of the moral facts—the genetic study of the moral life and the moral consciousness—it may also be called a natural or descriptive science. To the second part of the work has been added a chapter on Moral Progress, the law of which is the discovery of the individual and of his place in the body politic, without which discovery ethics would be meaningless. The author has, moreover, endeavored to re-think the entire subject, and to throw some light upon the real course of ethical thought in ancient and in modern times, and in particular to restate the contribution of Aristotle and other Greeks to moral science. Accordingly he has adopted the term Eudæmonism in its original Aristotelian sense as having relation to goodness, using it to characterise his own position in contradistinction to Hedonism, which is the expression of ethical realism, as distinguished from ethical

idealism or transcendentalism. Professor Seth describes Eudæmonism as the Ethics of Personality, and he refers in the Preface to the present volume to the fact that the distinction between the "individual" and the "person," which was insisted on by Hegel, finds a leading place in the discussion of the ethical problem, following the example of Professor Laurie in his *Ethica, or the Ethics of Reason.*

The distinction between the individual and the person is fundamental in connexion with the ethical problem and it will be well to see how Professor Seth deals with it. In his introductory remarks he compares the ancient and the modern conceptions of the moral ideal. The former he affirms to be external, the ancients being inclined to regard the end as something to be acquired rather than as an ideal to be attained; whereas the modern conception of morality is mechanical, owing to its tendency to exaggerate the notion of law. This is consistent with the difference in the moral ideal entertained by the ancient and modern worlds. The one was political or social and the other is individualistic, both which views are inadequate although they are complementary. The moral individual cannot be isolated. He is a social or political being. On the other hand, "the individual is more than a member of society; he is not the mere organ of the body politic. He too is an organism, and has a life and ends of his own. The good is, for every individual, a social or common good, a good in which he cannot claim such private property as to exclude his fellows; their good is his, and his theirs. Yet the good—the only good we know as absolute—is always a personal, not an impersonal, good, a good of moral persons." The author concludes, therefore, that the person, and not society, is the ultimate ethical unit and reality. What is meant by "person" is evident from the description of Eudæmonism as "the Ethics of that total human Personality which contains, as elements, both reason and sensibility."

It is in connexion with the theory of Eudæmonism that the distinction between the individual and the person is fully explained. In answering the question, What is the self? Hedonism answers, the sentient self; rationalism, the rational self; and Eudæmonism, the total self, rational and sentient. The sentient self is the individual self which is possessed by animals as well as by men. That is, man by virtue of his sentient existence is animal, and this is the character of his individuality. But man is a rational animal, and it is his self-consciousness, the "power of turning back upon the chameleon-like, impulsive, instinctive, sentient or individual self, and gathering up all the scattered threads of its life in the single skein of a rational whole, that constitutes the true selfhood of man." It is this higher self, which is restricted to man, that Professor Seth intends by "personality," as distinguished from the lower or animal selfhood of mere individuality. He insists, nevertheless, that the person is always an individual, and that the personality constitutes itself out of the individuality and acts upon it. Reason has no exclusive interests of its own apart from those of sensibility. Its interest is in fact the total interest of sensibility itself. The key to the ethical harmony is, says the author, *Be a person*, by which is meant "constitute out of your natural individuality, the

true or ideal self of personality." This is to be effected through the action of reason, which operates in man as will. Will is not attributed to the animal as it cannot "arrest the stream of impulsive tendency, but is borne on the tide of present impulse."

In Part III. of his work Professor Seth treats of the metaphysical implications of morality, and says truly that ethics is not mere anthropology—"to interpret the life of man as man, we must interpret human nature, and its world or sphere, we must investigate man's place in nature, his relations to his fellows, and his relation to that life of God which in some sense must include the life of nature and of man." In conclusion, therefore, he treats of the three problems of the Metaphysic of Ethics—the problems of Freedom, God, and Immortality. The solution of these problems is consistent with the general theory of the work, which is deserving of high praise, not only for the nature of its argument but also for the clearness with which it is enforced.

C. S. W.

DIE SOCIOLOGISCHE ERKENNTNIS. Positive Philosophie des socialen Lebens. Von *Gustav Ratzenhofer*. Leipsic: F. A. Brockhaus. 1898. Pages, 372.

The author, who is a professed follower of August Comte, having written a three-volume work on the nature and purpose of politics as a part of sociology, sketches in the present volume the nature of sociological cognition. Herr Ratzenhofer insists in the first section of his book on the importance of sociological cognition, a truth which cannot be denied. He claims that philosophy of late has lost its importance, and the opinion is gaining ground that the end of all philosophy is close at hand. In fact, philosophy has been ousted by experimental psychology and finds it difficult to prove its right of existence. But we are assured that philosophy may hope for a regeneration from sociology. At present it consists of purely subjective speculations, but broadened by psychological investigations it will make scientific ethics, æsthetics, jurisprudence, and political economy possible.

There are two foundations for sociology. One is based on psychology, the other on natural science. In discussing the former (Section II.) Herr Ratzenhofer enters into biological investigations of the origin of consciousness from the primordial force or *Urkraft*, which is an idea of fundamental importance in the author's metaphysics. It is the *Urkraft* from which all living creatures emanate. The natural sciences teach the mutual interdependence of all things, and this law shows itself in gravitation, in chemism, in organisms, and in social institutions. This leads to the fourth section, in which social institutions are discussed. Here Herr Ratzenhofer explains the nature of hordes, the origin of custom, the life of nomads, agriculture, the right of work, the right of conquest, the origin of state, the solidarity of interests, the evolution of nations and social differentiation, religions, and similar topics. Of special interest to American readers will be the author's opinions on the colonisation of America and Australia, especially as he has apparently never set foot on either continent. The United States of North America are superior to

other colonies, because they were founded by religious exiles. A mixture of the colonists with the natives was impossible, continues Herr Ratzenhofer, on account of the incompatibility of the races, but black slaves were introduced as workers in the fields. The sociological importance of slavery became prominent only through the mixture of negroes and whites which ultimately led to their emancipation. Mulattoes in the South multiplied the social divergency, while in the North they remained excluded from society. They are not allowed a share in the social differentiation. This dooms them, and thus they have already begun to re-emigrate to Liberia in Africa, and partly pursue only such industries as practically render them the lowest class of population, and are, through the increase of the white race, more and more suppressed.

North America, Herr Ratzenhofer claims, lacks that wealth of forms which distinguishes the interests of Europe. The one-sidedness of industrial interests produces that uniformity which, as we have learned from him, in considering the history of the yellow race, is not favorable to a higher social development. As to Australia, we are told that emigration there consisted, first, of deported criminals, then of the surplus of that part of the population which was driven from home through competition, and thirdly, of gold-seeking adventurers. This renders Australian society even more uniform than that of the United States, and the body politic lacks every warlike incentive, greed being the only motive which dominates social interests. The fifth section explains the fundamental doctrines of sociology which finds in differentiation the main law of social development, Here we meet with such topics as the tendency of perfection in the social process, individualisation, and socialisation, etc. The sixth section explains the social forces, especially the will of the individual and the social will. The seventh section shows the social evolution in the light of social cognition.

We need scarcely enter into further details, as we must leave it to the reader to form his own opinion how far our author has succeeded in contributing his share to the progress of sociology. It is sufficient for us to have characterised the book in general and to have called to it the attention of our readers. *κρς.*

ERRATUM.

In the review of Mr. Hawley's *Logic* (April *Monist*, page 464, line 14 from bottom) the word "Hamiltonian" was accidentally omitted before the parenthetical words ("with its paralogisms"). The stricture was intended, of course, to apply to the Hamiltonian system only, and not to the Aristotelian.

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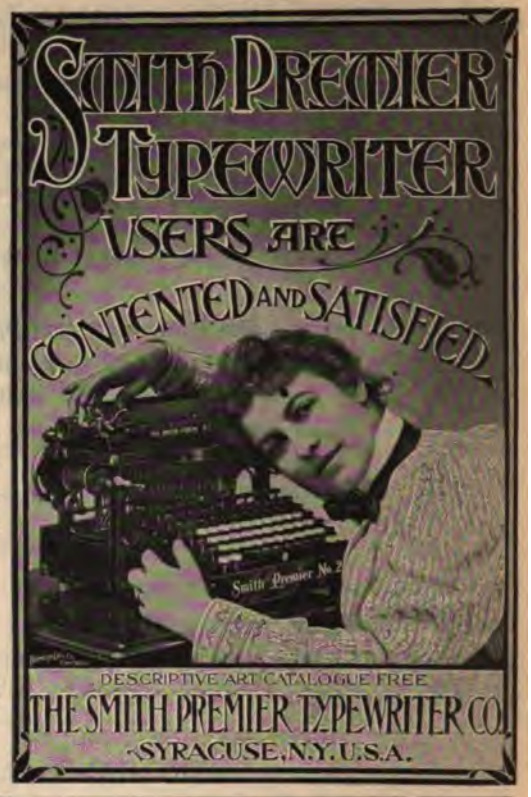
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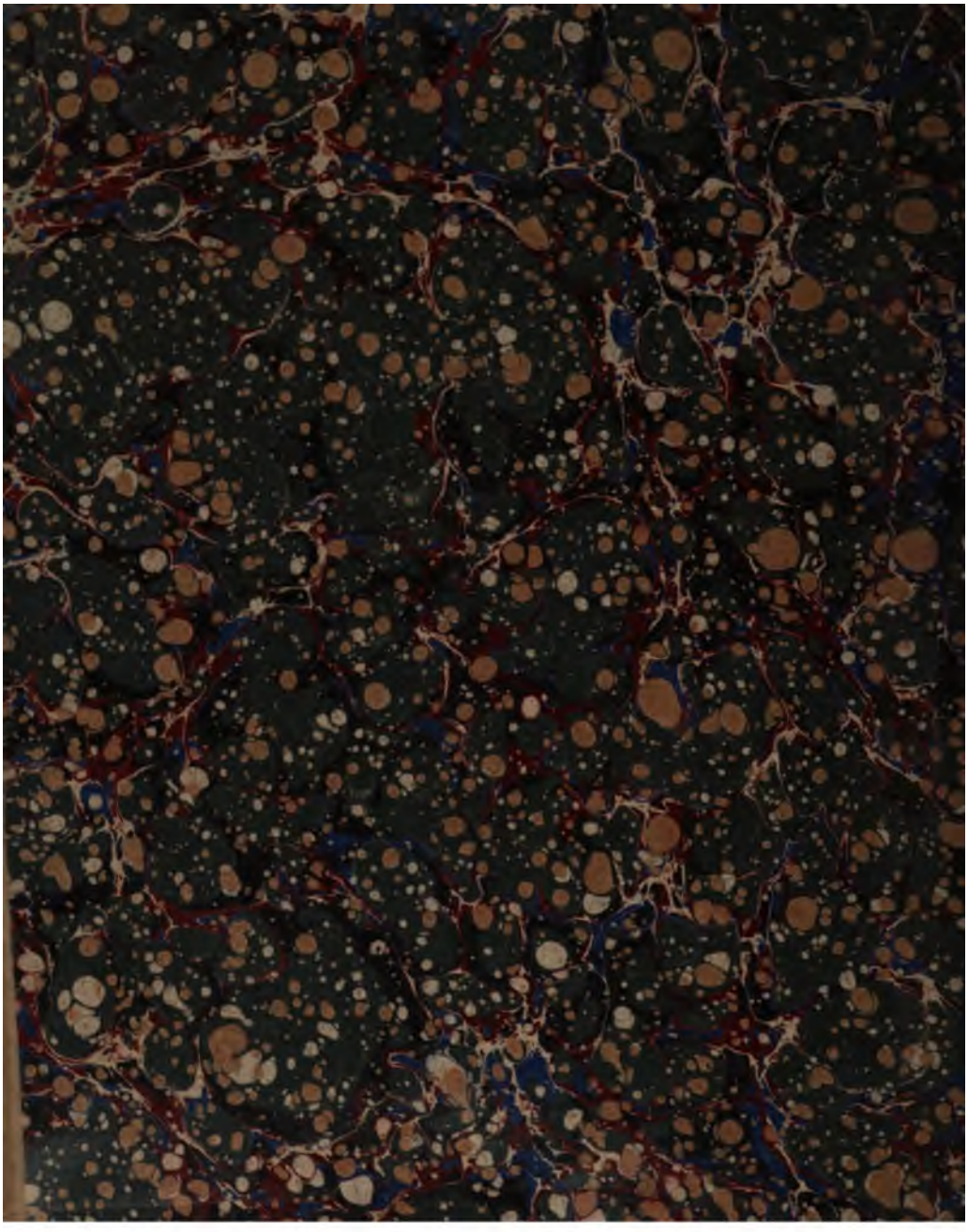

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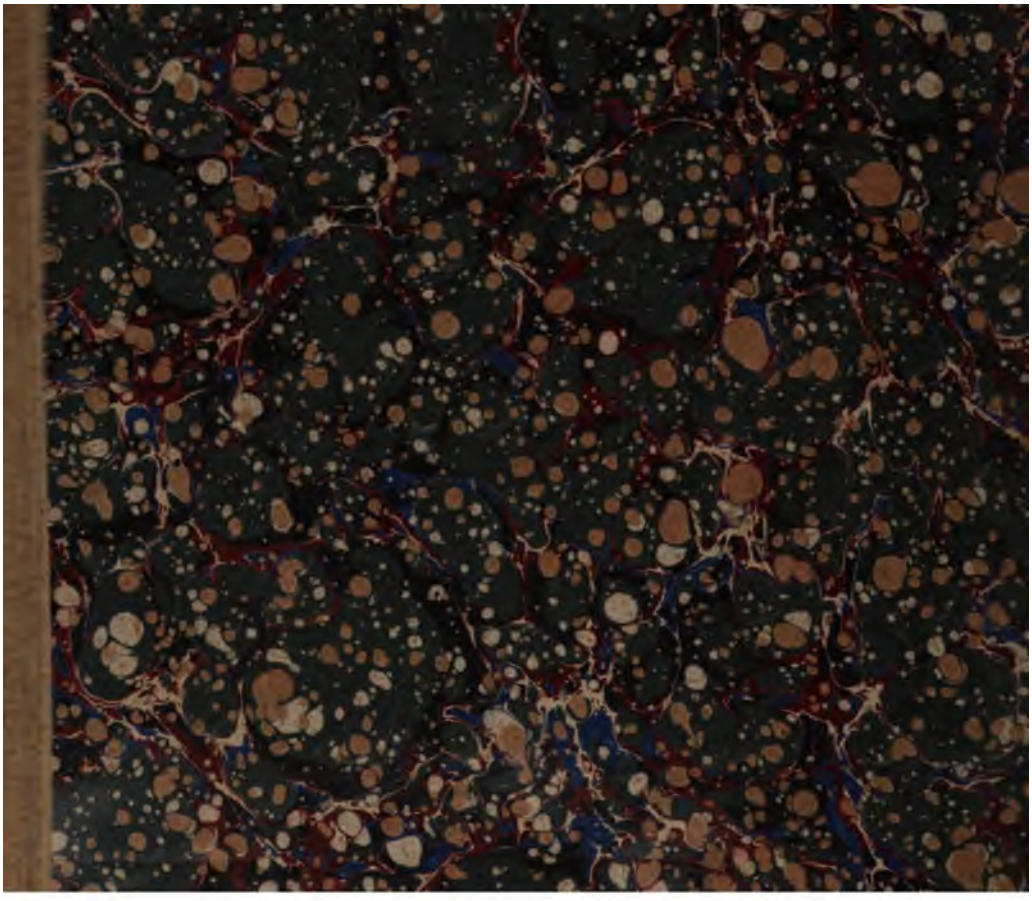

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